

THE JESUP NORTH PACIFIC EXPEDITION

UNIV. OF MICHIGAN
FEB 29 1904

Volume III, Number 5

OCTOBER, 1903

THE
AMERICAN MUSEUM
JOURNAL



WITH SUPPLEMENT ON
THE COLLECTION OF FOSSIL VERTEBRATES

Published quarterly by
THE AMERICAN MUSEUM OF NATURAL HISTORY
Seventy-seventh Street and Central Park West
New York City

Entered, as second-class matter, Post Office at New York, N. Y.
Act of Congress of July 16, 1894.

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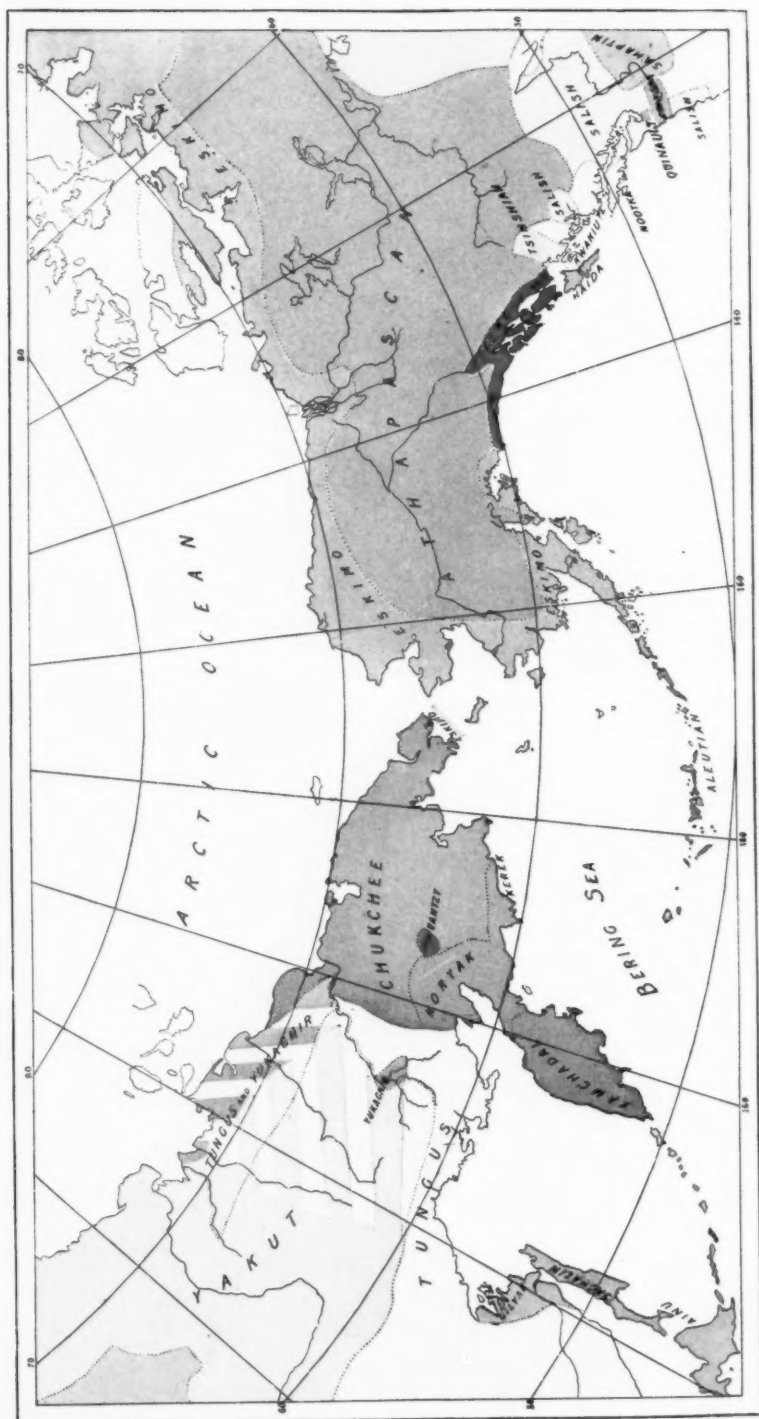
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THE AMERICAN MUSEUM OF NATURAL HISTORY was established in 1869 to promote the Natural Sciences and to diffuse a general knowledge of them among the people, and it is in cordial coöperation with all similar institutions throughout the world. Since the Museum authorities are dependent upon private subscriptions and the dues from the members for procuring needed additions to the collections and for carrying on explorations in America and other parts of the world, the attention of persons interested in such matters is called to the brief statement of deeds and needs on the fourth page of the cover of the Supplement.

The Museum is open free to the public on Wednesdays, Thursdays, Fridays, Saturdays and Sundays. Admittance is free to Members every day.





JESUP NORTH PACIFIC EXPEDITION—FIELD OF OPERATIONS

The American Museum Journal

VOL. III.

OCTOBER, 1903

No. 5



FOR many years the American Museum of Natural History has had before it the investigation of the life of man on this continent, and since 1897 the larger question of the tribal relations between the early inhabitants of America and those of Asia. Much time and labor have been devoted to these researches, the most important of which have been included in the work of the Jesup North Pacific Expedition. This enterprise has aroused public interest to such an extent and evoked so many inquiries from all parts of the world that it has been deemed best to give a brief résumé of the history of its organization and of the field work which has been carried out by it. The résumé, which is published in this number of the JOURNAL, has been prepared by Professor Boas, to whom President Jesup intrusted the planning and direction of the whole expedition. It is not easy to find men of science fully qualified for such technical lines of research, and though the personnel of the different parties carrying on the work is given in the narrative, it will not be out of place to state regarding the men engaged to prosecute the investigations in Siberia that Dr. Laufer was recommended to the Museum by the Academy of Sciences at Berlin as a man amply equipped for work in this territory, while Messrs. Jochelson and Bogoras bore the highest testimony from both that Academy and the Imperial Academy of Sciences at St. Petersburg. With such men, the Museum felt that whatever the final results might be, it certainly had placed its interests in worthy hands. The list of papers that have been published gives some idea of what has been accomplished already. It is estimated that the completed series of scientific reports resulting from this expedition will fill at least twelve quarto volumes.

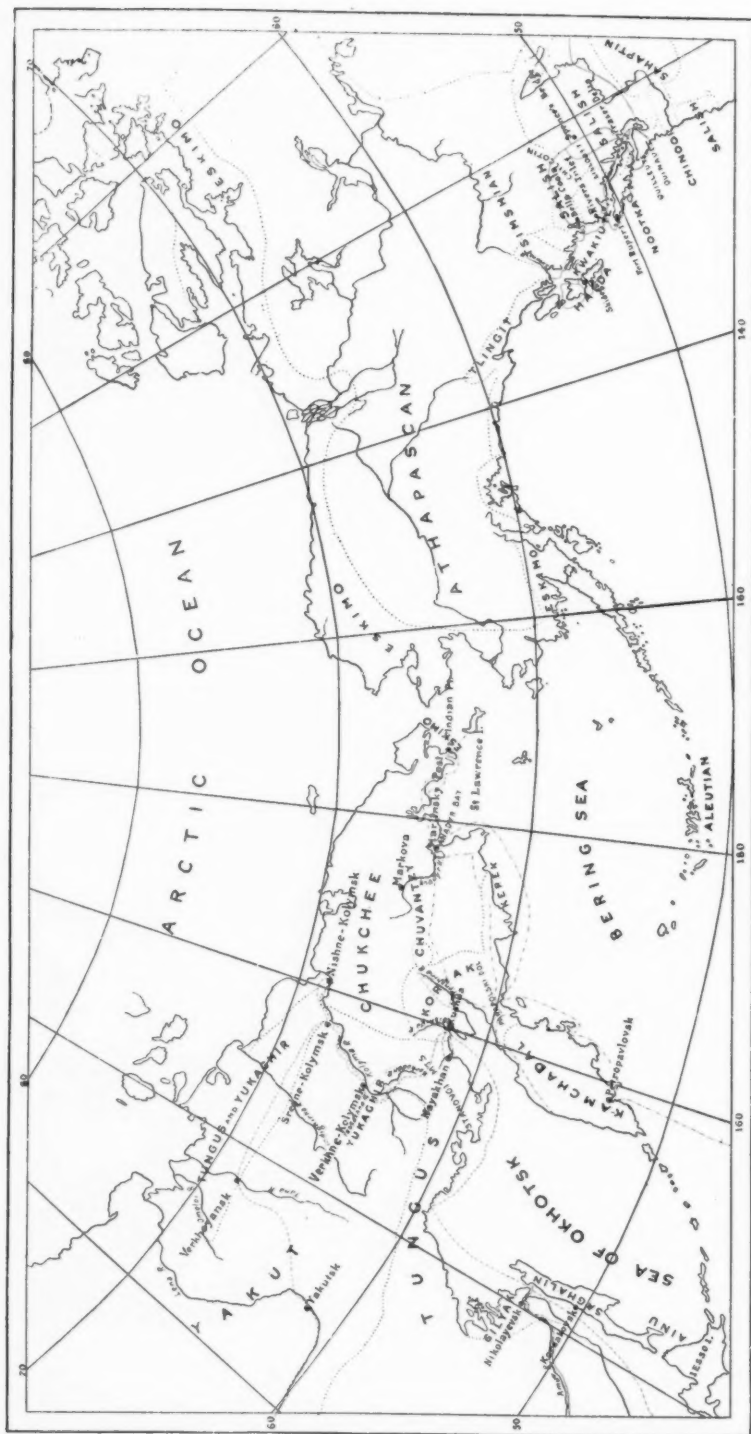
The readers of the JOURNAL may be interested in the inner

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history of an incident connected with the organization of the Expedition which is barely touched upon in the narrative. The incident, furthermore, shows the friendly feeling of the Russian Government toward the United States and links the Museum with the educational work and policy of the Czar. Dr. Laufer's home was in Cologne, Germany, but he came to New York *en route* to the Amur River region by way of Vancouver. It was necessary to have his passport *viséed* by the Russian Consul General in New York before he could enter Siberia, but that official refused to give his certification. President Jesup carried the matter to the Russian Ambassador at Washington, who, however, declined to reverse the ruling. The Department of State at Washington then was asked to intercede with the Russian government through Mr. E. A. Hitchcock, the United States Ambassador at St. Petersburg, but the Russian Minister of the Interior declined to interfere in the matter. Then were enlisted the good offices of Professor Radloff, Director of the Ethnographical Museum in St. Petersburg and also a prominent member of the Imperial Academy of Sciences, and through him the matter was brought to the personal notice of the Grand Duke Constantine Constantinovitch, President of the Academy, who conveyed President Jesup's request directly to Emperor Nicholas II. His Imperial Majesty overruled the preceding decisions and granted Dr. Laufer permission to carry on the proposed investigations "as an act of courtesy to the Government of the United States, as well as in the interests of ethnological research."

The Guide Leaflet issued with this number of the JOURNAL is a general introduction to the study of the collections on exhibition in the halls of the Department of Vertebrate Palæontology. During the past summer the exhibition collections of this department have been entirely rearranged and have been brought into accord with the advances made in the science up to the present time. This has rendered necessary the entire re-writing of the Guide Leaflet which was issued in January, 1902. Guide Leaflets to special portions of the exhibit have been prepared or are in course of preparation. One of the series, that on the Evolution of the Horse, was issued in January, 1903.





ROUTE-MAP, JESUP NORTH PACIFIC EXPEDITION

The red lines show the principal routes traversed by the parties in the field from 1897 to 1902 inclusive. In North America the journeys of the different parties have not been indicated separately, the country having been covered in so many directions; in Asia the dot-and-dash line shows the course followed by the Bogoras party; the broken line, that of the Jochelson party; the solid line, that of the Laufer party.

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AMONG the great problems of anthropology, the one which stands out as of particular interest and importance to the American people is the problem of the earliest history of the native races of our continent and their relation to the races of the Old World. Questions relating to this problem have been the subject of much speculation, particularly in our own country. While the science of anthropology was still in its infancy, the flight of imagination carried away investigators and led them to identify the American race with one or another ancient people of the Old World. Later a reaction set in, which culminated in the view of Dr. D. G. Brinton, who considered the American race and American culture as entirely independent of those of the Old World. This view, however, seems to be too extreme to be tenable. The question of the relation between the people of the Old World and those of the New may be stated in the following manner:

There is little doubt that the American race has inhabited our continent for a long time. Although no finds have been made that establish its geological antiquity beyond cavil, we have good reason to believe that man inhabited this continent at a very early time. The principal foundation for this belief is the existence of well-marked varieties of the American race, the establishment of which must have occupied a long period. The general characteristics of the race are fairly uniform. The smooth dark hair, broad heavy face, large nose and rather full mouth are common to all the natives of America. But nevertheless a number of distinct types have developed, differing in color of skin, in form of head and of face and in proportions of the body. The differences in these types show that much time was necessary for their development.

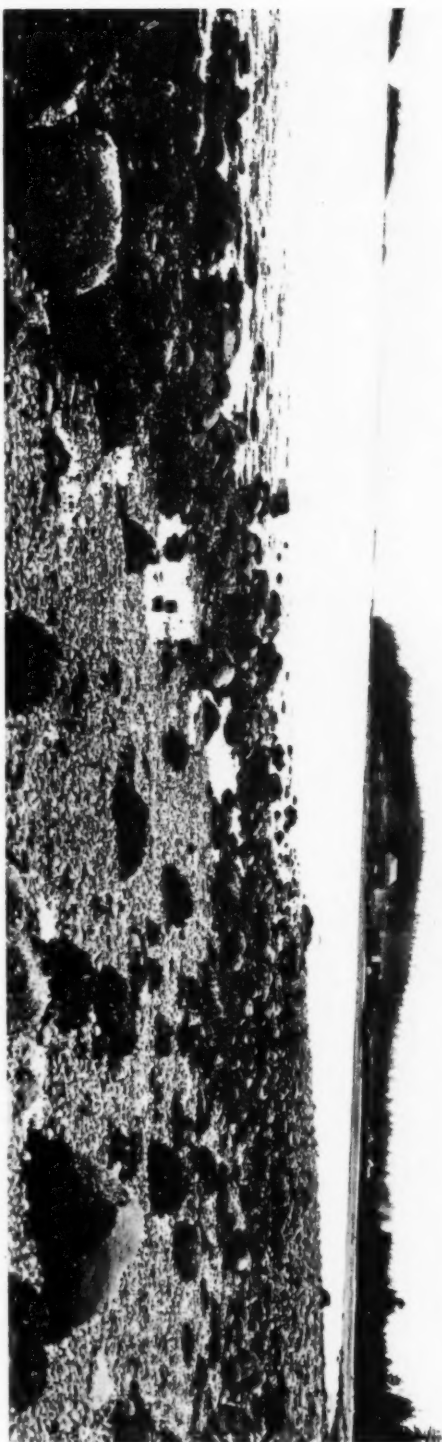
The long occupancy of our continent, which thus seems probable, implies that American culture passed through a long period of development. It is likely that the distinct types of the race developed in isolated spots, and therefore culture must also have followed distinct lines of growth.

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This period, however, has long since passed. At the time when American tribes entered the field of our knowledge, and even in periods of which archæology alone gives evidence, contact had been established between the tribes of the north and of the south, of the east and of the west, so that it is no longer possible to consider as the product of isolation the cultural possessions of each tribe. Archæological evidence also shows that distinct types followed one another in the occupancy of each area. In short, changes of far-reaching importance took place long before the tribes became known to history. These changes imply mixture of blood as well as exchange of cultural achievement.

A systematic investigation of the question in how far American race and culture can be considered as independent must necessarily take up the study of those regions where the geographical connection between the Old World and the New is closest. One of these regions is the coast of the North Pacific Ocean; another is far to the south, where the wide scattering of the Polynesian people suggests the possibility that they also may have reached our continent. Of these two regions the northern one seemed to be more likely to give results. Here the geographical conditions favor migration along the coast-line and exchange of culture. Our knowledge of this area previous to the work of the Jesup Expedition indicated that manifold changes in the culture and location of the tribes inhabiting this area had taken place. The multiplicity of languages spoken along both coasts, and their division into numerous dialects; the great variety of types of the area, their irregular distribution and their affiliations with types of distant regions; the peculiar types of culture,—all indicate that the primitive tribes of the coast have passed through a long and varied history. The types of man which we find on the North Pacific coast of America, while distinctly American, show a great affinity to North Asiatic forms, and the question arises, whether this affinity is due to mixture, to migration or to gradual differentiation. The culture of the area shows many traits that suggest a common origin, and others that indicate diverse lines of development.

What relation these tribes bear to each other, and particularly



FORT RUPERT, VANCOUVER ISLAND

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what influence the inhabitants of one continent may have exerted on those of the other, are problems of great magnitude, the solution of which lies in a careful study of the natives of the coast, past and present, with a view to discovering as much as possible of their history. These were the problems that attracted the attention of Morris K. Jesup, Esq., President of the American Museum of Natural History, and induced him to provide personally with great liberality the means for carrying on investigations.

Since the ultimate conclusions of the expedition were to be based on detailed comparisons of the types of man, cultures and languages of the North Pacific coast, it was necessary to organize several expeditions to collect the required information. It seemed best to divide the area among specialists, each devoting his energies to a certain group of tribes. The amount of work to be done in both Siberia and America was very great, on account of the great differentiation of tribes. It therefore seemed necessary to set certain limits to the work of the expedition. In Asia the isolated tribes of northeastern Siberia were made the special subject of our studies, while in America the isolated tribes between Bering Strait and Columbia River were to be investigated. The problem to be solved in Asia was the relation of the isolated tribes of Siberia to the Turkish and Tungus tribes of that continent on the one hand, and to the isolated tribes of northwestern America on the other. In a similar way the problem in America was the relation of the coast tribes of the Northwest to the inland and southern tribes of our continent and to the Siberian tribes of the other.

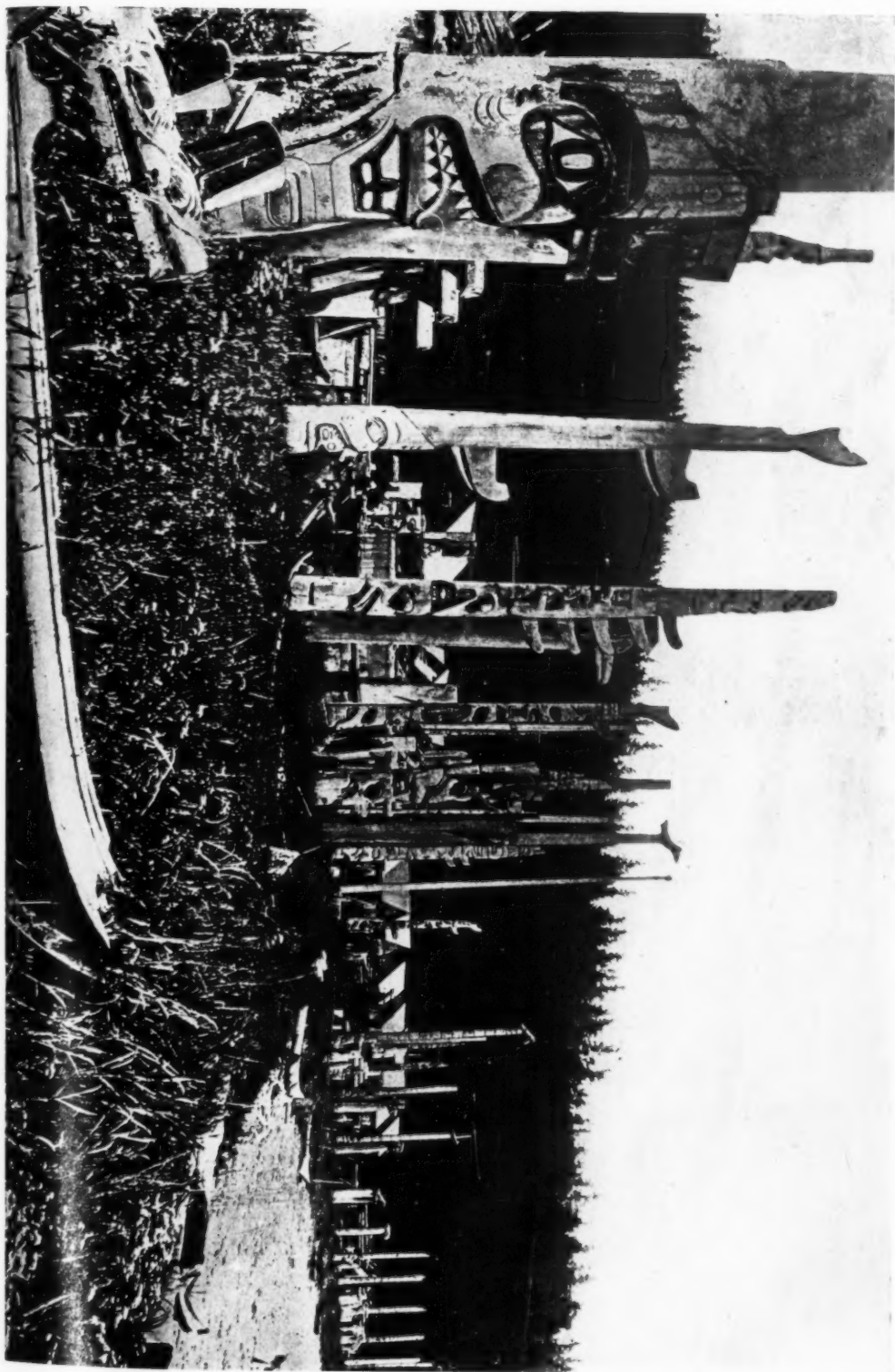
The multiplicity of tribes in America is clearly shown on the map on page 68. Since the Eskimo of Alaska had been studied by Mr. E. W. Nelson for the United States Government, and since the Tlingit had been investigated by Lieut. G. T. Emmons, U. S. N., who it is hoped may publish the results of his researches, the principal work by the Jesup Expedition had to be done in British Columbia and the State of Washington. The most important topics to be studied were the eth-

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nology of the coast of Washington, that of the Salish tribes of the interior and of the coast, that of the tribes of Vancouver Island and that of the Haida of Queen Charlotte Islands. At the same time archæological investigations had to be carried on in the whole region.

The party which carried on operations during the year 1897 consisted of Prof. Franz Boas of the American Museum of Natural History, Prof. Livingston Farrand of Columbia University, New York, and Mr. Harlan I. Smith of the American Museum of Natural History. This party was assisted in the field by Mr. James Teit of Spence's Bridge, B. C., Mr. George Hunt of Fort Rupert, B. C., and Mr. Fillip Jacobsen of Clayoquot, B. C. The New York party travelled westward by way of the Northern Pacific railroad, through the courtesy of whose officials the journey was rendered most pleasant. After having made the necessary preparations in Victoria, B. C., they proceeded to Spence's Bridge, where they arrived on the 2d of June, and were met there by Mr. Teit. The great familiarity with the language of this area which Mr. Teit had acquired during a long period of residence there, and the deep interest which he took in the Indians, made him a most valuable assistant in the investigations. Early in the year 1897 he collected notes on the Thompson River Indians for the use of the Jesup Expedition; and with his help a number of additional data were obtained, mainly bearing upon the art of the Indians, their language and their physical characteristics. While these investigations were being carried on, Mr. Smith made preparations for archæological investigations in the valley of the Thompson River.

It was soon found that Spence's Bridge was not the most favorable place for excavations; and for this reason Mr. Smith moved his base of operations, first to Kamloops and later to Lytton, which is situated at the confluence of the Fraser and Thompson Rivers. At Kamloops and Lytton, Mr. Smith conducted extensive excavations on the hillsides and in the valley, discovering numerous remains of previous habitations, some of which are without doubt of considerable antiquity. Almost all



HAIDA VILLAGE, QUEEN CHARLOTTE ISLAND

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his finds antedate the advent of the whites and give us an excellent insight into the culture of the people at that period. Beautiful carvings in bone illustrate the high development of plastic art that had been attained by the Indians; shells from the seacoast indicate the existence of early intertribal trade, and numerous implements made of stone, bone and shell illustrate the general state of culture of the tribe.

While Mr. Smith was conducting his investigations at Kamloops, Professors Boas and Farrand, accompanied by Mr. Teit, started on a lengthy trip northward, which was intended to serve two purposes: to investigate the physical characteristics of the Indians inhabiting the banks of the Fraser River north of Lytton, and to study the customs and physical characteristics of the Chilcotin, the most southern Athapascan tribe of British Columbia. From Chilcotin it was intended to continue the journey over the mountains to the coast, in order to study the Bella Coola, an interesting tribe, whose customs and beliefs had never been subjected to systematic inquiry. The party started with a train of ten horses from Spence's Bridge and crossed the mountains to Lillooet on narrow trails. It was hoped that a considerable number of Indians would be met with in the high valley of Botani, where the tribes of Fraser River and Thompson River assemble every spring, but only comparatively few were encountered and the journey was continued after a short delay.

At Lillooet Professor Farrand separated from the main party and visited the villages of the Upper Lillooet on Seton and Anderson Lakes. Meanwhile the pack-train slowly proceeded along the wagon-road leading to Caribou. All the Indian villages that are situated on or near the wagon-road were visited, and a considerable number of anthropometric measurements were collected. After about a week Professor Farrand, who had completed his work among the Lillooet tribe, rejoined the party. On the 3d of July they reached Soda Creek, on Fraser River, the most northern village inhabited by the Shuswap tribe. Then they crossed the river and proceeded westward in order to visit the territory of the Chilcotin. After a few days the first village of this tribe was reached. The party proceeded slowly from

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village to village until the most western Chilcotin village of any considerable size was reached. Now the further investigation of the interesting tribe was left to Professor Farrand, while Professor Boas proceeded on his journey across the mountains to Bella Coola.

The Chilcotin have been brought into contact with the whites in comparatively recent time, and, although they now live in log-cabins, raise cattle and horses, and till the soil, they are probably the most primitive among the tribes of British Columbia. A number of families still roam in the mountains between Lillooet and Chilcotin River, and have not been induced to settle on reservations; consequently the field of investigation was most interesting, and the results of Professor Farrand's ethnological inquiries are of great value. He spent most of his time in the larger villages of the Chilcotin; but during the month of August he visited the isolated families which live on the shores of Tatla Lake and in the mountains. From here he proceeded northward until the pass which leads to Bella Coola was reached.

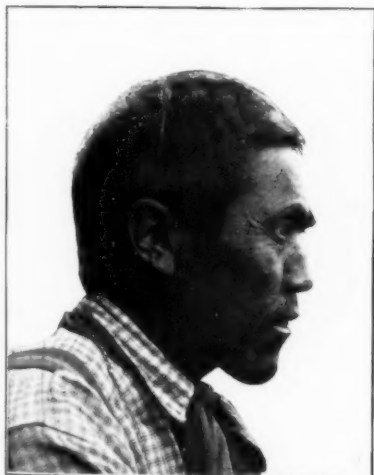
Professor Boas followed the more northern route towards this pass, crossing the wild plateau north of Tatla Lake. On this journey a few of the Chilcotin who make their home near Lake Nakootloon were encountered. From here there seems to be an enormous gap in the Coast Range, through which a trail leads westward, following a small river that takes its rise in the high mountains of the range. Gradually the valley narrows and the beautiful peaks and glaciers of the Coast Range come into view. The trail ascends higher and higher, until at a height of five thousand feet the summit is reached. Here a few small snow-fields have to be crossed and the trail suddenly emerges on the north side of Bella Coola River. The river is visible almost five thousand feet below; and on the opposite side of its deep and narrow valley rises the high peak, Nuskulst, which plays a most important part in the mythology of the Bella Coola. Enormous glaciers flank the sides of the mountain. A little farther down the river other snow-clad mountains of beautiful form come into view. In early times the villages of the Bella Coola were found all along the river, up to a place about twenty miles above



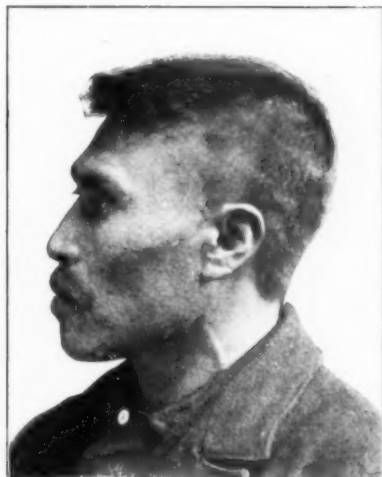
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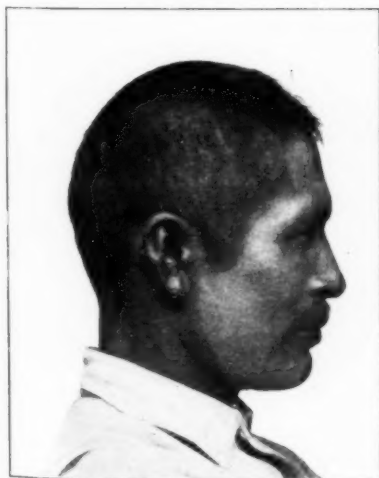
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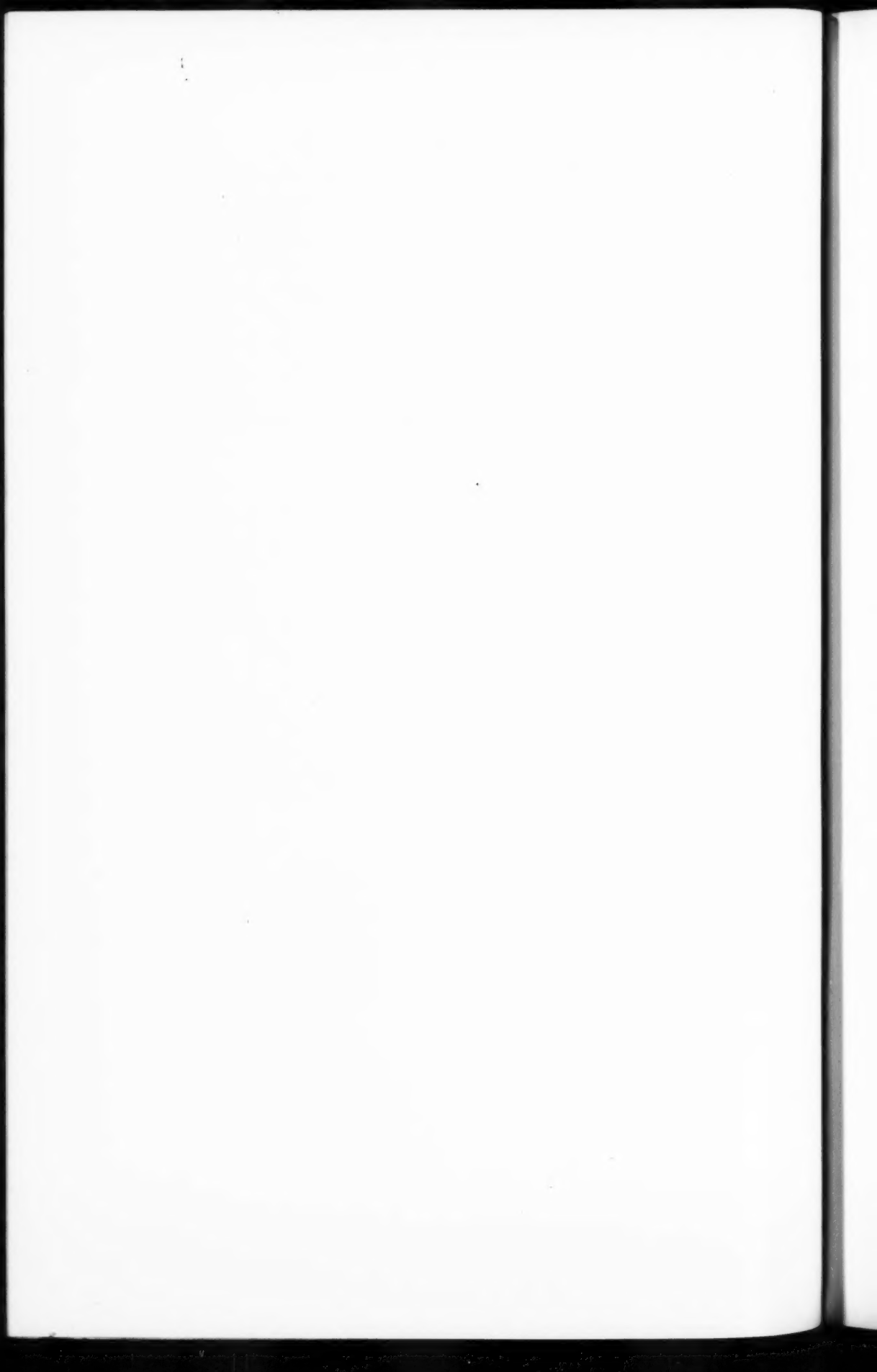
NOOTKA



THOMPSON



QUINALT



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Nuskulst, but the tribe has so diminished in numbers that all the villages on the banks of the river have been abandoned. The trail descends the steep mountain-side until the river is reached, at a point about twenty-five miles above its mouth. Here the deep and rapid river had to be crossed. The party built a raft, on which an Indian embarked in order to fetch a canoe that was seen on the other side. In this the men crossed the river, while the horses swam over. Another day's journey brought the travellers to the village of the Bella Coola Indians. The road passes through a Norwegian settlement that has recently been established in this valley. At Bella Coola Professor Boas was met by Mr. Hunt, who, under special instructions, had collected valuable specimens among the Indians. The pack-train returned over the mountains to Fraser River, while Professor Boas staid among the Bella Coola Indians.

After obtaining much interesting information regarding the customs and beliefs of the Bella Coola, Professor Boas started down Bentinck Arm. Then he went by steamer northward to Skeena River, where he joined Mr. Smith, who had finished his work in the interior of British Columbia by the beginning of August. Some time was spent near the mouth of Skeena River in making investigations on the graphic art of the Haida Indians and in studying the physical appearance of the Tsimshian and Haida. Mr. Smith obtained a valuable series of photographs, while Professor Boas was engaged in making measurements of the people. By this time Professor Farrand had completed his work among the Chilcotin. Accompanied by an Indian, he crossed the mountains and at Bella Coola met Mr. Hunt, who was finishing his work in that tribe. Toward the end of August, both left Bella Coola to pay a visit to the village of Bella Bella, which is situated just outside the mouth of Bentinck Arm. Professor Farrand spent the remainder of the summer here studying the social organization and arts of this tribe, and Mr. Smith assisted him in the study of the physical appearance of the people.

After Professor Boas had completed his work on Skeena River, he journeyed southward on a coast steamer and was joined at Bella Bella by Mr. Smith and Mr. Hunt, while Professor

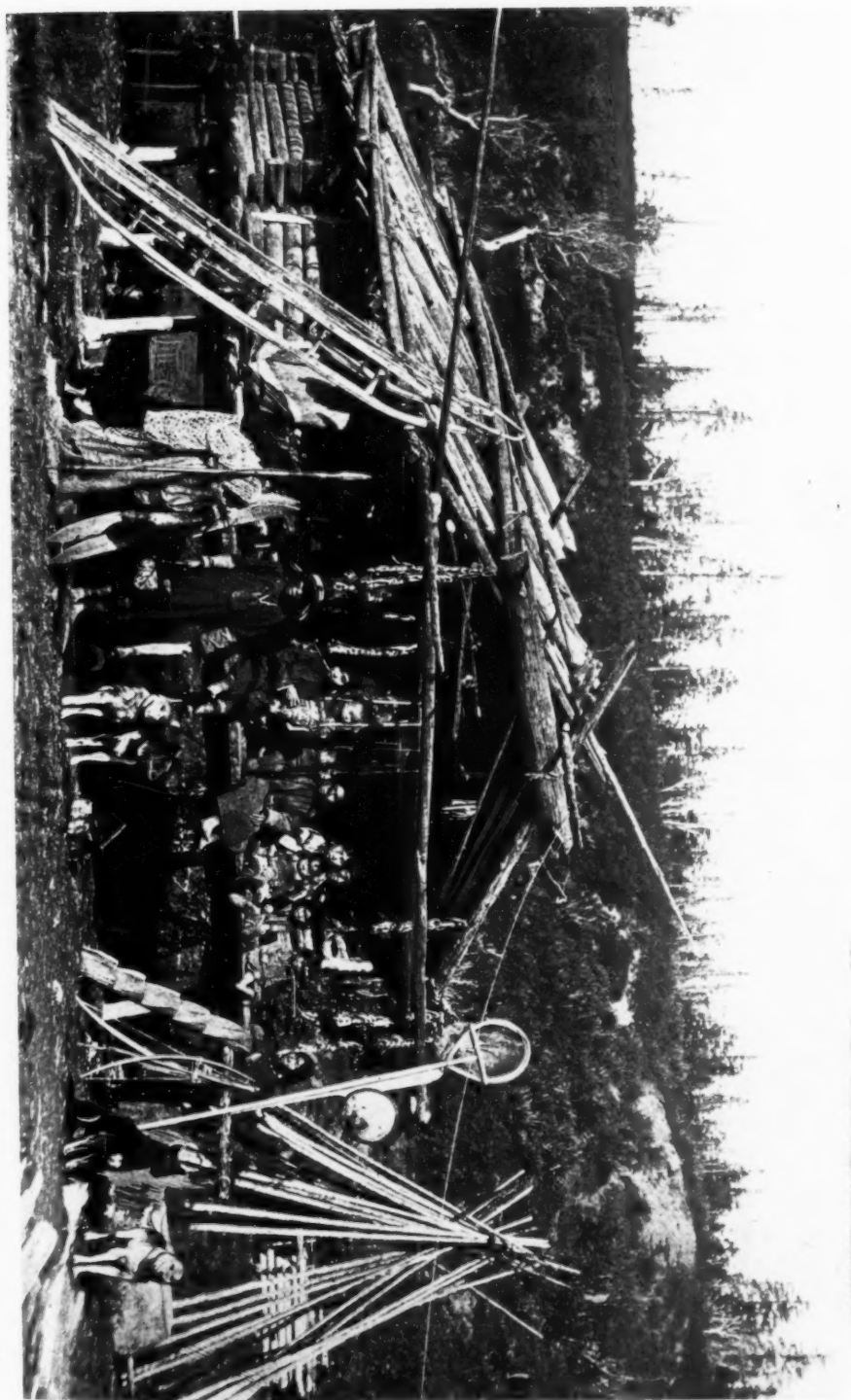
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Farrand staid behind, continuing his investigations. The party landed in Rivers Inlet, where a stay of several weeks was made. Mr. Smith again assisted in the study of the physical appearance of the Indians, and after this work had been ended continued his journey to Vancouver, in order to resume his archæological investigations. Professor Boas and Mr. Hunt, who staid at Rivers Inlet, succeeded in collecting much interesting material on the language and customs of this little-known tribe. In the middle of September Professor Farrand joined them, having completed his work at Bella Bella. Soon afterward Mr. Hunt went to his home in Fort Rupert, while Professors Boas and Farrand returned to New York.

Mr. Smith, after going back to Vancouver, took up the investigation of the shell mounds at the mouth of Fraser River, which yielded important results, clearing up interesting points in the history of the Indians. It seems that the physical appearance of the Indians during the period of deposit of the shell mounds on Lower Fraser River had undergone material changes. The results that were obtained here were so important that it was necessary to continue the researches during the next year. When the rainy season set in, Mr. Smith moved his camp to southeastern Vancouver Island, where he spent some time in the investigation of prehistoric stone monuments. Finally, in the middle of November, the winter rains set in, which compelled him to conclude his operations.

During the summer Mr. Phillip Jacobsen undertook to make a collection illustrating the culture of the tribes of the west coast of Vancouver Island. His intimate acquaintance with the Indians and his varied experience in ethnological work made his assistance of great value. The expedition is also under great obligations to Dr. Charles F. Newcombe, who contributed an interesting collection from Queen Charlotte Islands.

In the summer of 1898 work in the State of Washington was begun by Professor Farrand and Mr. Smith. The isolated character of the coast-line between Grey's Harbor and Cape Flattery had subjected the Indians who inhabit it to less white influence than most of the Pacific tribes, and rendered their investiga-



GILYAK HOUSE, AMUR RIVER, SIBERIA

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tion of particular interest. The region also formed a geographical link between the Vancouver Island and British Columbia stocks on the north and the Chinook on the south, both of which had previously been visited and studied, and had disclosed a number of problems with reference to the cultural relations between them which demanded the filling out of the gap. The territory in question is occupied by two tribes—the Quilleute on the north and the Quinault on the south; the former now the sole representative of the Chimakuan stock, and the latter one of the southern representatives of the Salish group. Professor Farrand first visited the Quilleute, reaching their village by way of the Strait of Juan de Fuca and an overland trail from Clallam to Lapush on the coast. Unfortunately, he found upon his arrival that almost the entire tribe had scattered for the summer salmon-fisheries, and it was impossible to procure the casts and records which were desired, but he remained for some days collecting such information regarding customs and folk-lore as was possible and preparing for a second visit later in the season. He then pushed on to the Quinault, where he had been preceded by Dr. Roland B. Dixon, who had been occupied in making casts of those Indians, and who, shortly after Professor Farrand's arrival, proceeded to the mouth of Fraser River to carry on his work there. Professor Farrand remained at the Quinault agency for nearly two months, engaged in making general ethnological and linguistic observations, and met with gratifying success. Toward the end of the summer he returned to the Quilleute, and, while still unable to find more than a few individuals of the tribe, collected some linguistic and other ethnological material of interest. The general results of the work show very clearly the gradual merging of the culture of the Northwest into the more southerly type. This merging is particularly observable in the mythology of the tribes.

In the summer of 1898 Mr. James Teit paid a prolonged visit to the Lillooet tribe, which is located in the mountains north of the Fraser River delta. He entered the territory of the tribe from the north and visited all their villages. The Lillooet were found to be of particular interest, because they form a link be-

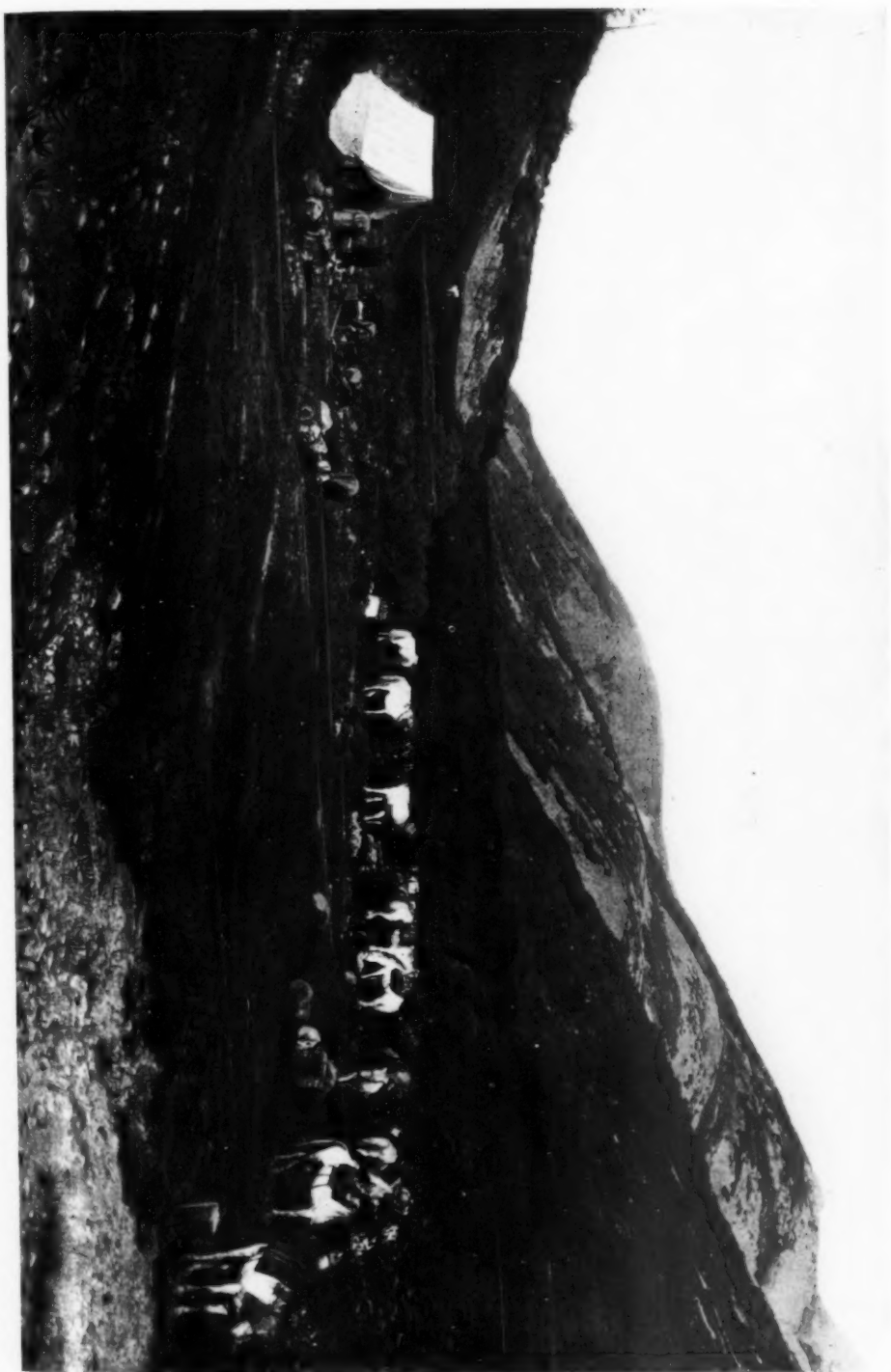
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tween the coast tribes and those of the interior. Dr. Dixon and Mr. Smith entered the Lillooet territory at the same time from the south. On this trip Dr. Dixon collected a number of photographs and plaster casts illustrating the types of this region, while Mr. Smith made a number of excavations at ancient village sites. In the same year Mr. George Hunt continued his collections among the Kwakiutl of Vancouver Island, a tribe with whose language he is thoroughly familiar.

Mr. Smith spent the greater part of the summer excavating in the shell mounds of Puget Sound and of the west coast of Washington. The results of his excavations show that there was a gradual merging of the ancient culture of this area into that of the Columbia valley, thus agreeing with the ethnological results obtained by Professor Farrand. Archæological work in this area requires much time and persistence, on account of the great scarcity of specimens in the shell mounds. On his return journey Mr. Smith investigated the Indian remains south of Spence's Bridge, and here also a gradual change of culture seemed to be revealed.

In 1899 the principal operations of the expedition were in Asia, as will be described later on; but Messrs. Hunt, Teit and Smith continued their researches. Mr. Smith turned his attention to the shell mounds and burial-cairns of northern Vancouver Island and the islands off the coast of Washington. Many of these cairns were explored, and the shell-heaps near which they were usually placed were examined. The cairns were found invariably to be of great age, and the skeletons which they contained were in a bad state of preservation, but much interesting information regarding the methods of burial of the prehistoric occupants of the region was brought to light, and much material for a study of their physical characteristics was obtained. Mr. Smith's work is the first comprehensive survey of the archæology of this region which has been made.

In 1900 Mr. Teit continued his work on the Salish tribes of the interior of British Columbia. Professor Boas first joined Mr. Teit, and undertook with him a journey on horseback to the villages of the Thompson Indians south of Spence's Bridge.



MR. JOCHELSON'S CAMP IN THE STANOVOI MOUNTAINS, SIBERIA

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Then he proceeded to the coast, and by appointment met Mr. Hunt at the northern end of Vancouver Island. There he spent the whole summer, visiting the fishing villages of the Indians and carrying on studies on their languages and customs. He also made a collection of plaster casts of Indian types.

On his return journey Mr. Teit met Dr. John R. Swanton, who was about to visit Queen Charlotte Islands in order to study the Haida Indians. In September, 1900, Dr. Swanton was conveyed by steamer to Skidegate, where he located for the winter. The Haida, who in former times lived in numerous villages all along the coasts of the islands, are so much reduced in numbers that they are now confined to two villages, while a portion of the tribe has located in southern Alaska. After several months spent at Skidegate, Dr. Swanton went to Masset, the northern village of the Haida, by canoe, and later visited Alaska. Finally he returned to Skidegate to take up some loose ends of his work, and returned east after a stay among the Haida which extended over more than a year. His work was supplemented by that of Dr. Charles F. Newcombe, who visited all the deserted villages of the Haida in a small boat, getting information on their exact location and on the geography of the country. At the same time he made a collection of plants.

In the years 1901 and 1902 Messrs. Hunt and Teit continued their studies for the expedition.

The isolated tribes along the east coast of Asia embrace the Ainu of Yezo and Saghalin, the Gilyak of the Amur River, the Kamchadal of the Peninsula of Kamchatka, the Koryak of the north coast of the Sea of Okhotsk, the Chukchee of the extreme northeastern part of Siberia, the Chuvantzy of the region west of the Chukchee and the Yukaghir of the Kolyma. In comparatively recent times Tungus tribes have settled in the territory which was probably originally inhabited by the other tribes alone.

The investigations on the Amur River were intrusted to Dr. Berthold Laufer and Mr. Gerard Fowke. Dr. Laufer had devoted himself to the study of the Tibetan language and of the history of Asiatic cultures, and was well prepared to take up the

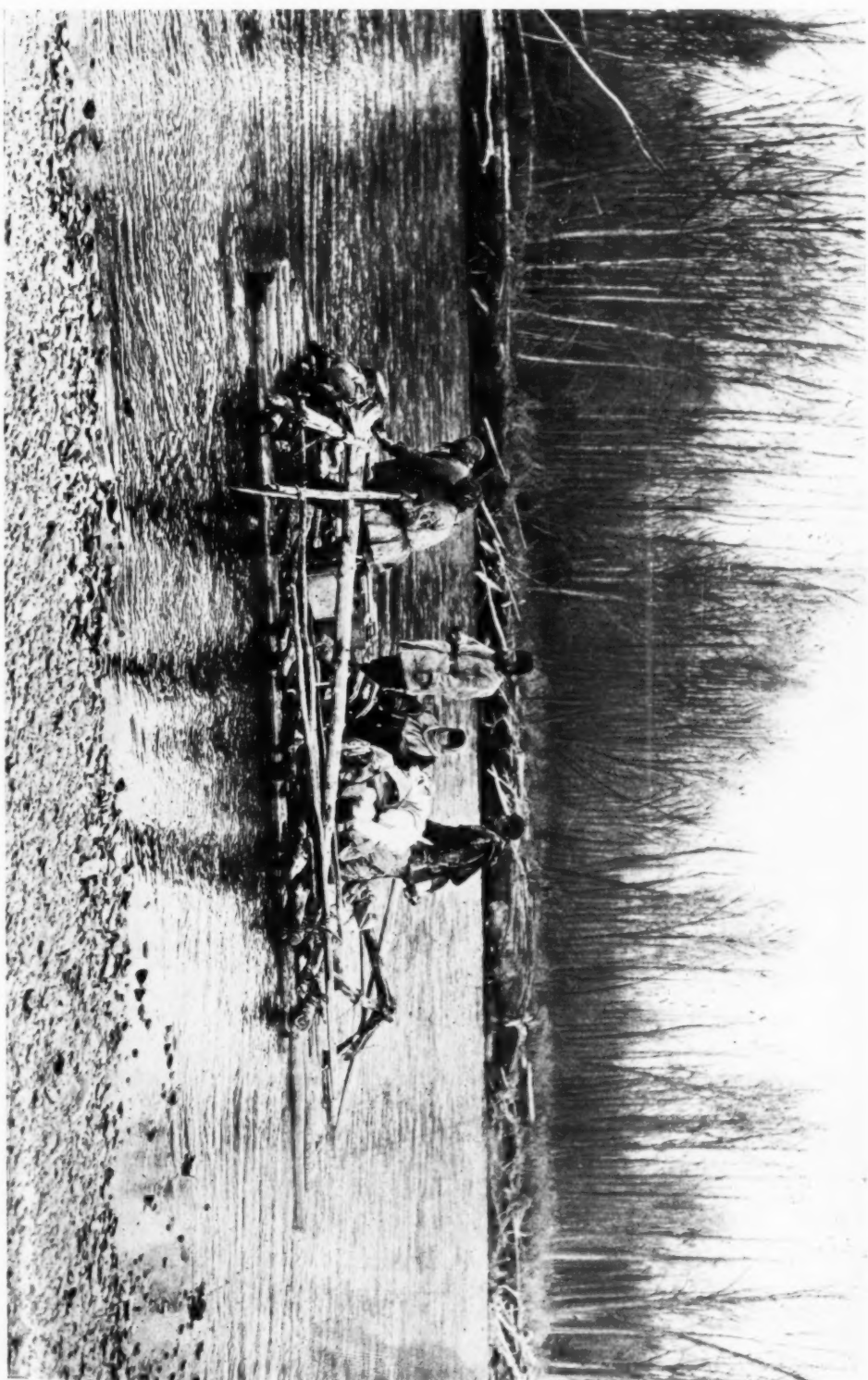
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problems offered by the Amur tribes. Mr. Fowke had done much archæological work in America, and he was to carry on archæological researches in the Amur province. Unfortunately the departure of the expedition was delayed by the difficulty of obtaining the necessary permissions and passports from the Russian Government. These obstacles were eventually overcome through the assistance of the United States Embassy in St. Petersburg, and through the active interest taken in the investigations by the Imperial Academy of Sciences of St. Petersburg. Dr. Laufer and Mr. Fowke arrived at Vladivostok on June 19, 1898, and proceeded thence to Khabarovsk, on the Amur. Here they separated. Mr. Fowke descended the Amur in a boat, investigating the remains along both banks of the river.

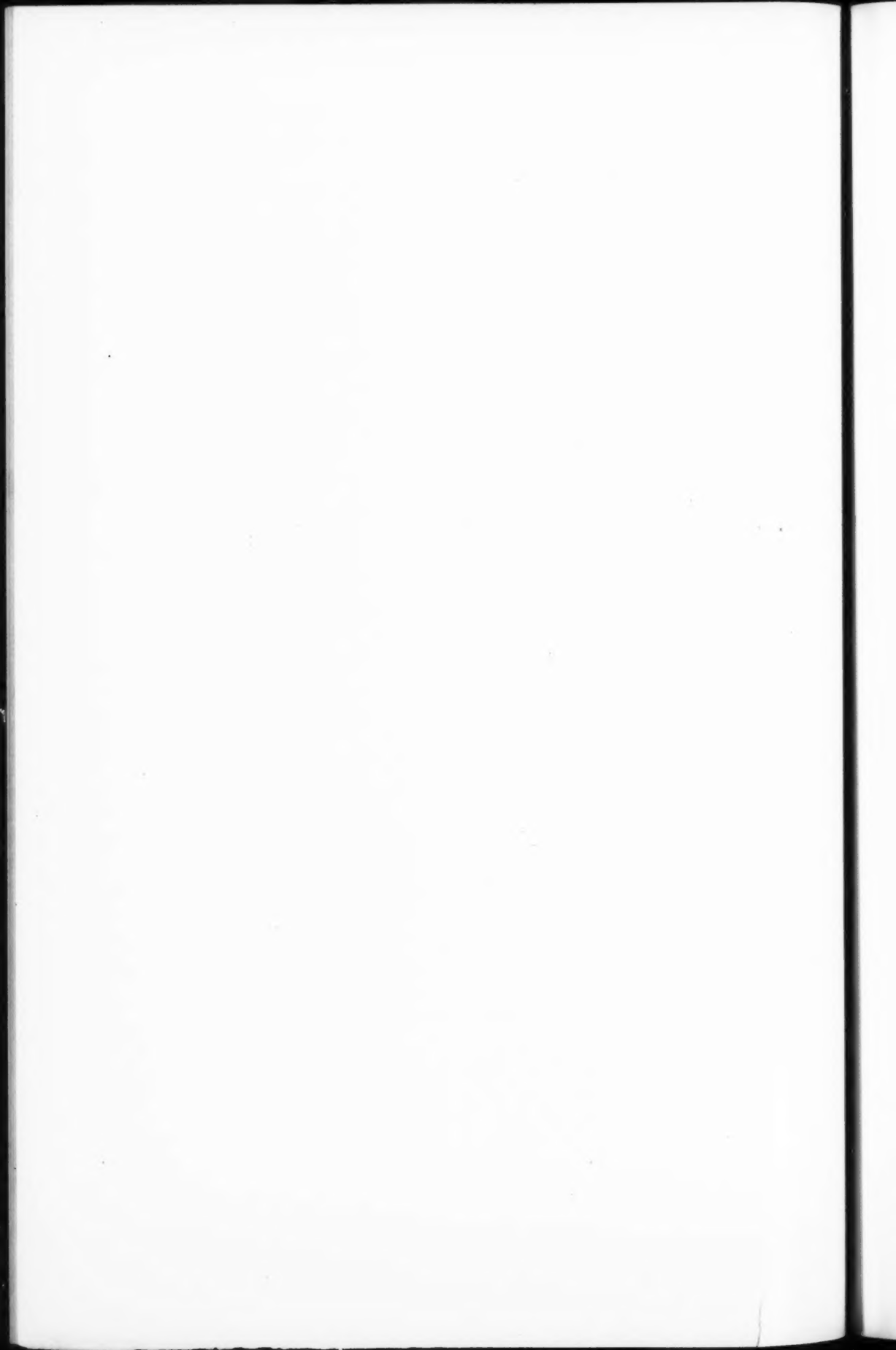
Dr. Laufer went down the river by steamer, and crossed to the Island of Saghalin, which he reached on July 10, 1898. He staid on the island until March 21, 1899, investigating the Gilyak, Tungus and Ainu tribes. The fall of 1898 he spent among the Gilyak tribes of the northeastern part of Saghalin; later he travelled southward along the east coast of the island. Unfortunately in October, when visiting a Gilyak village about twelve miles inland, Dr. Laufer was taken ill with the grippe, which was followed by pneumonia, so that his investigations suffered a long interruption. When hardly well enough to resume his work, he journeyed southward, at first on horseback and then on reindeer-sledges, visiting the Tungus and Ainu of the central and southern parts of the island. When about to continue his journey farther southward, he received a telegram from the Russian Governor, informing him of the presence of a band of desperadoes, who had built a fort in that region and had terrorized the whole country. Nevertheless he spent enough time among the Ainu to collect a considerable amount of valuable information.

On March 4, 1899, he reported on the progress of his work as follows:

Among the collections which I made on the Island of Saghalin there are several very interesting specimens. I obtained from the Olcha Tungus a collection of wooden idols and amulets made of fish-



MR. JOCHELSON AND PARTY ON KORKODON RIVER, SIBERIA



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skin which are quite new to science. I have had very good success in using the phonograph, and have obtained songs of the Gilyak and Tungus. Linguistic work on Saghalin was very difficult, because there are no interpreters capable of translating texts. There is no one who knows more than the most common phrases of Russian. Among the Ainu, Russian is entirely unknown; and for the purpose of interpreting I had to use Japanese, with which, however, they are not very familiar either. Nevertheless, my knowledge of the Japanese language facilitated my work among them since they like the Japanese people. I collected most of my material among the Ainu during the night-time, because it is only at this time that everything is active. There is a great difference between the Ainu dialects of Yezo and Saghalin, the latter being much more archaic. I did not succeed in obtaining any anthropometric measurements. The people were afraid that they would die at once after submitting to this process. Although I had their confidence, I failed in my efforts in this direction, even after offering them presents which they considered of great value. I succeeded in measuring a single individual, a man of imposing stature, who, after the measurements had been taken, fell prostrate on the floor, the picture of despair, groaning, "Now I am going to die to-morrow!"

I started comparatively late on my journey along the east coast of Saghalin, because I was detained for two months and a half by a severe attack of influenza. As soon as I had sufficiently recovered, I visited one of the Gilyak villages where the people were celebrating one of their bear festivals. I was welcomed with much delight, since I met several of my acquaintances of last summer. For five days I assisted in the ceremonial, and was even permitted to witness the sacrifice of the dog, which is kept secret from the Russians. . . . On New Year's eve I reached my southernmost point on the island. On the following day I took phonographic records of songs, which created the greatest sensation among the Russians as well as among the natives. A young Gilyak woman who sang into the instrument said, "It took me so long to learn this song, and this thing has learned it at once, without making any mistakes. There is surely a man or a spirit in this box which imitates me!" and at the same time she was crying and laughing with excitement.

On the 2d of January I started by dog-sledge northward. This journey was exceedingly difficult, and sometimes even dangerous. At one time I narrowly escaped drowning when crossing the ice at the foot of a steep promontory. I broke through the ice, which was

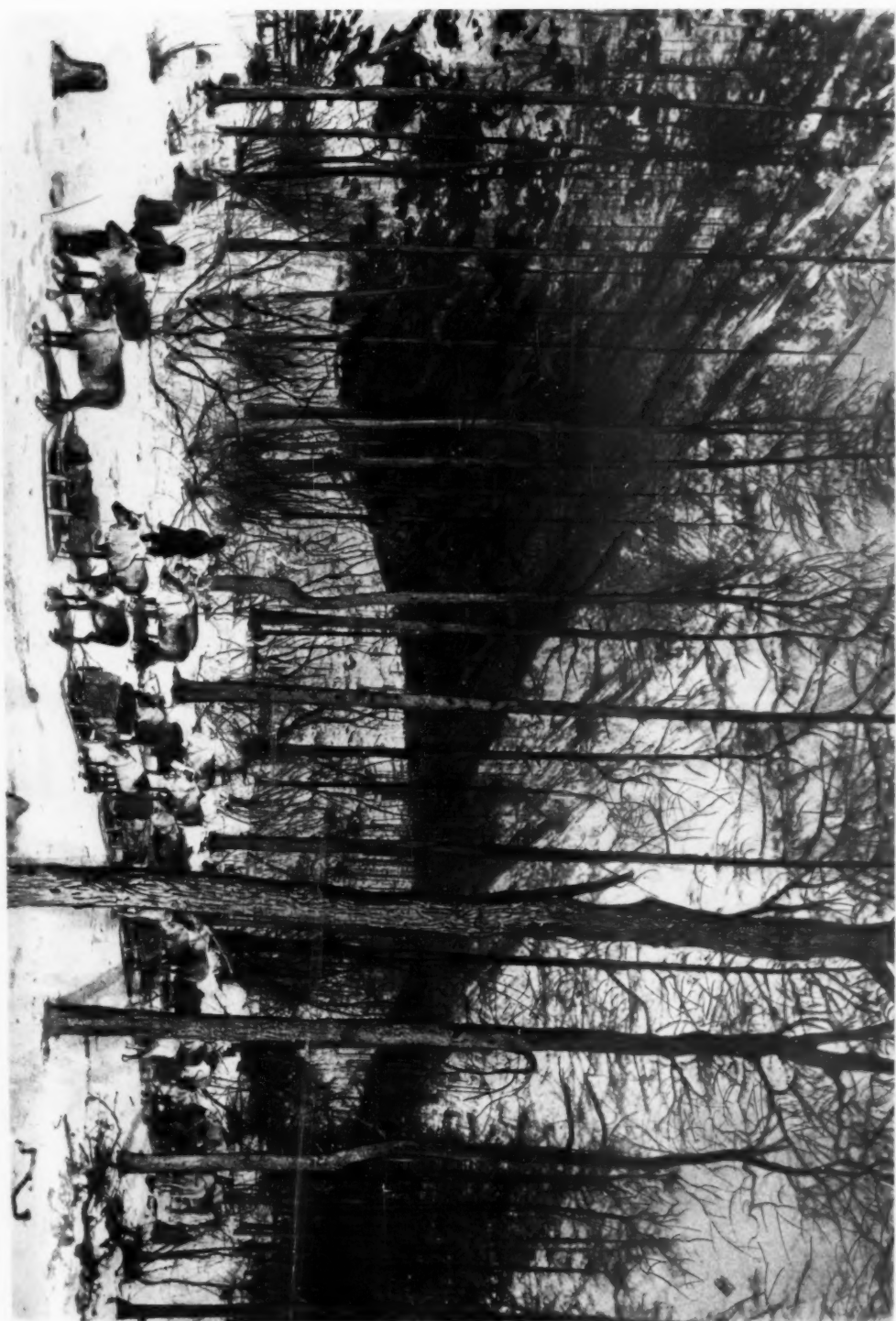
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much weakened by the action of the waves. Fortunately my guide happened to upset his sledge at the same moment when I broke through. Thus it was that he saw my situation, and extricated me with his staff.

Toward the end of the month I arrived at Korsakovsk, making the last hundred versts (sixty-seven miles) on horseback. Originally I intended to return from this point along the west coast of the island; but this proved to be impossible, since there is no means of communication in winter. For this reason I had to return northward the same way that I came, and had to travel as rapidly as possible in order to reach Nikolayevsk in time, for by the end of March it becomes impossible to cross the ice between the island and the mainland. Therefore I returned with all possible speed; working and collecting, however, whenever opportunity offered.

On March 21 Dr. Laufer crossed to the mainland in order to take up his studies of the Gold, a Tungus tribe. He reached Khabarovsk on March 25. Since a considerable number of Gold are located at that point he settled there and carried on his investigations among the natives. By the end of May, navigation on the Amur being reopened, he started on a boat journey down the river, visiting villages of the Gold, and farther down those of the Gilyak. After reaching Nikolayevsk, he paid a visit to the Gold tribes on the Amgun River, and finally returned to Vladivostok. On October 19, 1899, Dr. Laufer started home, and after spending some time in Japan, reached New York early in 1900. Mr. Fowke had left Vladivostok a little earlier, and reached New York in the fall of 1899.

The plans for the work in the arctic part of Siberia were elaborated with the assistance of the Imperial Academy of Sciences of St. Petersburg. Professor W. Radloff, director of the Ethnographical Museum and a member of the Academy, suggested that the work be intrusted to Messrs. Waldemar Jochelson and Waldemar Bogoras, who had for several years carried on important studies in Siberia under the auspices of the Imperial Geographical Society. In the summer of 1898 Professor Boas visited Europe, and, after consultation with Professor Radloff, had a number of conferences with Mr. Jochelson, in which the



REINDEER-TEAMS TRANSPORTING MR. JOCHELSON'S OUTFIT ACROSS THE VERKHOVANSK MOUNTAINS

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general plan of the expedition was decided upon. According to this plan, Mr. Jochelson was to undertake the study of the Koryak and Yukaghir; Mr. Bogoras, that of the Chukchee and Eskimo. Through their former expeditions Mr. Jochelson was already familiar with the Yakut and part of the Yukaghir, while Mr. Bogoras knew the western Chukchee intimately. The expedition was to begin in the year 1900. Mr. Bogoras was to stay among the Chukchee and Eskimo until the summer of 1901, while Mr. Jochelson proposed to begin his studies on the Sea of Okhotsk, and then to travel westward over the Stanovoi Mountains to the Yukaghir, whence he intended to return by way of Yakutsk and Irkutsk in 1902. Later this plan was slightly modified, in that Mr. Bogoras undertook the linguistic study of the Koryak, whose speech is closely related to that of the Chukchee.

Messrs. Jochelson and Bogoras reached New York in March, 1900. A considerable part of the outfit of the expedition had been purchased in Europe and shipped to Vladivostok direct. The rest of the purchases were made in America, and in April the party left San Francisco bound for Vladivostok, which was reached May 16. In New York Mr. Norman G. Buxton was added to the party. He was charged with the making of collections of zoölogical material. Mrs. Jochelson and Mrs. Bogoras, who were to share the hardships of the journey with their husbands, and to undertake part of the work of the expedition, had gone to Vladivostok by way of the Trans-Siberian Railway. Besides, Mr. Jochelson had engaged Mr. Alexander Axelrod of Zürich as a general assistant, particularly for carrying on the geographical work incidental to the expedition. Mr. Jochelson undertook the general leadership.

At Vladivostok the expedition separated into two parties. Mr. and Mrs. Jochelson and Messrs. Axelrod and Buxton were to make their headquarters at Gishiga; Mr. and Mrs. Bogoras, at Mariinsky Post, at the mouth of the Anadyr River. The Bogoras party left Vladivostok on June 14, on board the steamer "Baikal." The departure of the Jochelson party was delayed until July 24, because, owing to the political complications in China, the gov-

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ernment transport "Khabarovsk," which visits Gishiga once every year, was employed for military purposes.

Mr. Jochelson reports on the progress of the expedition in his immediate charge as follows:

On August 16, 1900, we landed in Kushka, a small village at the mouth of the Gishiga River. The condition of affairs in the district of Gishiga was very sad. In the winter of 1899-1900 this region had been visited by an epidemic of measles. According to the church registers, 179 persons out of a total of 500 had died at Gishiga between December 25, 1899, and March 1, 1900. When we reached Gishiga, the grippe prevailed and everybody was sick abed. Contrary to my expectations, there were no Koryak near Gishiga. The Reindeer Koryak, who are in the habit of wintering near this place, had moved far into the mountains with their herds, in order to escape the ravages of the prevailing epidemic. Neither was it easy to reach the villages of the Maritime Koryak, which are located on Penshina Bay, east of Gishiga. There is no regular means of communication in summer, because at that season travel across the tundra by dog- or reindeer-team is impossible. Sea-going boats which could withstand the heavy seas at Cape Taigonos, between the bays of Gishiga and Penshina, were not available, so that, in order not to lose the remaining summer months, I made up my mind to attempt the tundra with pack-horses. These, however, were hard to get. There were sixty-five horses in all, in the region, the property of the Russian inhabitants of Gishiga. Most of these had been hired by a Russo-American gold-mining company, which was represented by an American engineer, Mr. Shockley. After a great deal of trouble I succeeded in hiring twenty horses, some of which were almost too young for use. Mr. Buxton staid in Kushka in order to make zoölogical collections, while the rest of our party started on September 10.

We were accompanied by a Cossack, an interpreter and two packers, who also served as guides. The trail across the boggy tundra and over the hills was very difficult. Pack-horses as well as saddle-horses became mired and had to be extricated, so that we did not average more than ten miles a day. One day, while our Cossack and interpreter were hunting two pack-horses that were carrying provisions and had run away up a side valley, I tried to proceed on my journey, accompanied by Mrs. Jochelson and Mr. Axelrod. We ex-

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pected soon to overtake our guides, who had gone ahead with the rest of the pack-horses; but when ascending a hill we lost the trail, and for two days we wandered about in the high, treeless tundra without food, fire or protection against wind and frost. At length we gathered a large pile of wood and started a fire, the smoke of which was discovered by our men, who had been searching for us all the time. At the foot of the last pass we had to cross we were overtaken by a snow-storm, which detained us for three days. At length on October 5, we reached Paren, a winter village of the Koryak. The village, however, was deserted, since the people were still living in their summer village, about fifteen miles distant. I sent my men to notify them of our arrival, and on the following day two skin boats arrived at the mouth of the river to convey us to the village Kuel, on the river of the same name. Before our departure from Paren, I sent back my two guides with the horses, which were exhausted by the long journey. The return journey of these men lasted eighteen days, and was full of accidents. In a snowstorm they lost six horses, the men themselves almost perished of cold and hunger, and after their arrival in Gishiga six more horses died of exhaustion.

After our arrival at Kuel, our investigations began. During the first half of the winter 1900-01 we carried on our work in the villages of the Maritime Koryak of the bays of Gishiga and Peshina. The second half of the winter was spent in the camps of the Reindeer Koryak in the interior of the country. When the winter trails were in good condition, I went to Gishiga to replenish my provisions and barter, and then we started with twenty dog-sledges for Kamenskoye, where I staid for some time.

While we were located at this place, Mr. Bogoras came overland on a visit from Anadyr, and spent the month of December with us. During this time he was engaged in studies of the Koryak language. After his arrival, I sent Mr. Axelrod to Anadyr to take charge of Mr. Bogoras's station until his return. Mr. Bogoras completed his linguistic studies, and then proceeded to visit the villages of northern Kamchatka. After his return, Mr. Axelrod staid with him at Anadyr.

In all my journeys I was accompanied by Mrs. Jochelson, who, being a candidate for the degree of medicine at the University of Zürich, took charge of the anthropometrical and medical work of the expedition and of most of the photographic work.

While among the Maritime Koryak, we lived most of the time in

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their underground dwellings, which are reached by a ladder leading down through the smoke-hole. It is almost impossible to describe the squalor of these dwellings. The smoke, which fills the hut, makes the eyes smart. It is particularly dense in the upper part of the hut, so that work that has to be done in an upright position becomes almost impossible. Walls, ladder and household utensils are covered with a greasy soot, so that contact with them leaves shining black spots on hands and clothing. The dim light which falls through the smoke-hole is hardly sufficient for writing and reading. The odor of blubber and of refuse is almost intolerable; and the inmates, intoxicated with fly agaric, add to the discomfort of the situation. The natives are infested with lice. As long as we remained in these dwellings we could not escape these insects, which we dreaded more than any of the privations of our journey.

The winter tents of the Reindeer Koryak are so cold that we could not work in them; therefore we had to put up a tent of our own. It was furnished with a small iron stove, and there we carried on our ethnological and anthropometrical work. At night, however, the tent was very cold, and we slept in bags made of wolf-skins. While on the way, we spent the nights on the snow, covered with fur blankets. Several times we were exposed to snowstorms, and had to wait under our blankets, covered with snow, until the gale was over.

In May we returned to Kushka, and I was engaged until June in packing up and cataloguing the collections which we had made in the winter. In June we started in two boats on the dangerous journey to the mouth of the Nayakhan River. At that time there were assembled at this place more than sixty tents of nomadic Tungus whom I proposed to visit. On our return journey the tempestuous sea drove us into the Bay of Atykyna, where we had to stay for five days, almost without any provisions. Fortunately on the fourth day of our stay my men killed two seals. In July I made a trip by boat from Gishiga to the mouth of the river Ovekova, where I visited a camp of Maritime Koryak. This was my last stay with the Koryak, and on July 28 I returned to Kushka.

While Mr. Bogoras's party was returning to Vladivostok from Mariinsky Post, and while Mr. Buxton was waiting for the steamer that was to take him back, I had to stay another year in northeastern Siberia, the object of my further investigations being the study of the Yukaghir of the Kolyma.



CHUKCHEE



KORYAK



YUKAGHIR



TUNGUS



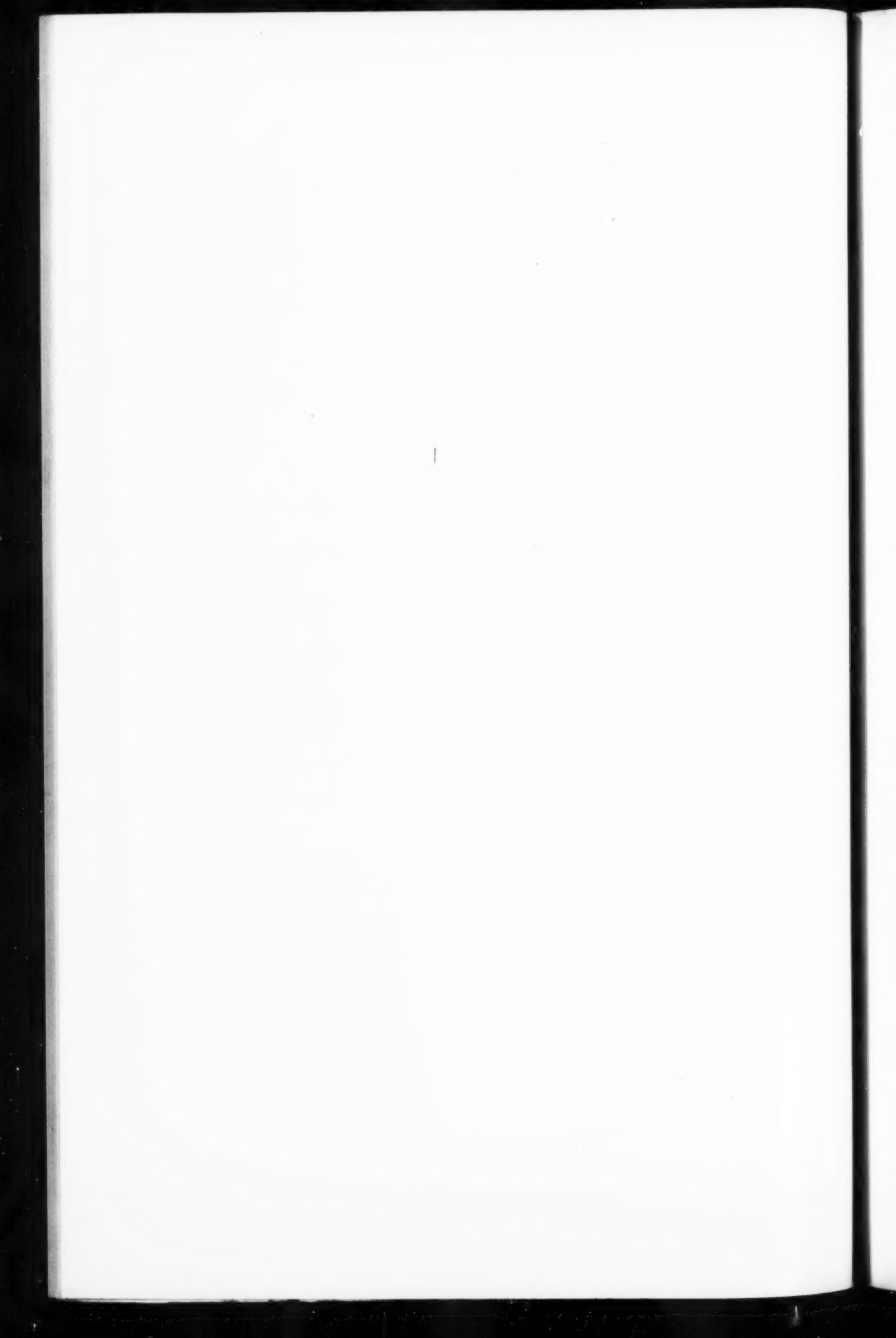
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GILYAK



AINO

SIBERIAN TYPES



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After the necessary preparations had been completed, I started with Mrs. Jochelson on August 15 from Kushka, on our journey across the Stanovoi Mountains to the Kolyma. I had hired twenty saddle- and pack-horses from the Yakut, and was accompanied by four Yakut packers, one Tungus guide, one Tungus interpreter and one Yukaghir chief.

Our journey from Kushka, at the mouth of the Gishiga River, to Verkhne-Kolymsk, on the Yassachna River, a tributary of the Kolyma, took fifty-six days—from August 15 until October 9, 1901. We were the first whites to cross the Stanovoi Mountains at this point. In winter, nomadic Tungus visit this country, but in summer it is deserted by all human beings. This journey was the most difficult one that it was ever my fate to undertake. Bogs, mountain torrents, rocky passes and thick forests combined to hinder our progress. Part of our provisions consisted of bread and dried fish. A heavy rain which fell during the first few days of our journey soaked the loads of the pack-horses and caused the provisions to rot. Therefore we had to cut down our rations from the very beginning. After crossing the passes of the Stanovoi Mountains, we reached the upper course of the Korkodon River. By this time our horses were exhausted, and it was necessary to take a long rest. Meanwhile the cold was increasing day by day, and haste was necessary if we were to reach Verkhne-Kolymsk before the closing of the river. Therefore I left three Yakut with the horses and the goods, and prepared to descend the river on a raft with the rest of my party, hoping thus to reach a camp of the Yukaghir which is located on the course of the Korkodon.

It took us one day to build a strong raft, and then we began the descent of the river, made dangerous by numerous rapids and short bends, by the rocky banks and by jams of driftwood. Our guides had intimated that we could make the descent in two days, but instead we spent nine days on the raft. It was my desire to leave ample provisions with the three Yakut who staid with the horses, and for this reason I had reduced our own allowance to the very lowest limit. Thus it happened that three days' rations had to last us through the nine days which we spent on the raft. For the last six days we had to be satisfied with forty-five pounds of flour, or an allowance of two cups a day for every person and a little tea without sugar.

We spent four days among the Yukaghir of the Korkodon, and after finishing our work and purchasing a supply of fish, we continued our journey to Verkhne-Kolymsk in a boat down the Korkodon and

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the Kolyma. The journey took seven days. In the night following the seventh day the river froze up while we were still forty miles from our goal. We left the boat, and after a tramp of two days reached Verkhne-Kolymsk on October 9, 1901. There I found the goods which I had sent ahead in 1900 from the Bay of Ola. From Verkhne-Kolymsk, a village of eight houses and one church, I visited the Yukaghir of the River Yassachna. It was December 8 when the Yakut whom I had left on the Korkodon reached Verkhne-Kolymsk. Then we proceeded to Sredne-Kolymsk, the capital of the district and a town of five hundred inhabitants, arriving there December 24. On January 6, 1902, we continued our journey to Nishne-Kolymsk, and then to the Yukaghir of the tundra west of the Kolyma. February 15 we returned to Sredne-Kolymsk, and March 6 started on our return journey. Passing Verkhoyansk we reached Yakutsk April 25, 1902.

The condition of affairs in northeastern Siberia happened to be very unfavorable during the time of my visit. A famine prevailed among the Yukaghir of the Yassachna. I assisted them as far as I could, and sent a messenger to Sredne-Kolymsk to request the assistance of the government. In the spring of 1902 the inhabitants of three Yukaghir tents on the Omolon were found starved to death. Even in Sredne-Kolymsk the fishing had been a complete failure, and the people were compelled to kill their dog teams because they could not feed them. Hunting on the tundra had also been a failure. Besides this, there were unusual demands made upon the horses and reindeer that are used as means of conveyance on the post-road from Yakutsk to Kolymsk, so that the animals were quite exhausted. On this road we met officers from Yakutsk, government messengers, and members of several expeditions:—the Mammoth expedition of the Imperial Russian Academy of Sciences, part of the polar expedition of Baron von Toll, and the English newspaper expedition of Harry de Windt. For these reasons the conveyance of the Yukaghir collections to Yakutsk was very difficult. We spent some time in the district of Yakutsk, where I made a Yakut collection. We started homeward July 16, 1902; reached Irkutsk August 8, where we took the railroad for St. Petersburg, and finally arrived at New York November 18, 1902.

The distance covered by myself and Mrs. Jochelson from Gishiga to Irkutsk amounted to nearly eight thousand miles. The results of our work are complete studies of the ethnography and anthropology of the Koryak and Yukaghir, illustrated by extensive collections.

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These collections embrace three thousand ethnographical objects, forty-one plaster casts of faces, measurements of about nine hundred individuals, twelve hundred photographs, one hundred fifty tales and traditions, phonographic cylinders, and skulls and archaeological specimens from abandoned village sites and from graves. I also made a small zoölogical collection, and obtained a large mammoth tusk weighing two hundred twenty pounds. During the whole period of my absence I kept a meteorological journal.

Mr. Jochelson does not state in this report that on his whole journey overland to the Kolyma, and from there through the district of Yakutsk, certain Russian officials, following a secret order issued by the Minister of the Interior, did all they could to hinder the progress of the expedition and to thwart its success. This action seems difficult to understand, in view of the hearty support and assistance rendered by the Imperial Academy of Sciences and the open letters issued by the Russian Government, requesting the officials of Siberia to render assistance whenever possible.

Mr. Bogoras gives the following description of his expedition:

We left Vladivostok June 14, 1900, for Mariinsky Post at the mouth of the Anadyr River, taking the only regular means of conveyance, the Russian mail steamer, which visits the place but once a year. Contrary to my expectations, I had not been able to charter a special steamer to carry the Anadyr branch of the Jesup North Pacific Expedition to the Chukchee Peninsula.

Mariinsky Post is the most remote settlement of the Russians in northeastern Asia. We arrived there after a five weeks' journey. A detachment of Cossacks is stationed there, by the side of a small native village. The Cossacks live in barracks built of timber and covered all over with earth. The native village is the southernmost settlement of the Maritime Chukchee, and is distant several days' journey from the nearest village of the same tribe. On account of an epidemic of measles which was ravaging the Chukchee villages, I could not hire a boat's crew for a journey to the north. Therefore I had to delay my visit to the northern villages until the next spring, when I crossed Holy Cross Bay on the ice. Before starting I had arranged to meet Mr. Jochelson at Kamenskoye, on the Sea of Okhotsk, where I was to spend some time studying the Koryak language. I also

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thought that it would be possible to proceed from Kamenskoye to northern Kamchatka, in order to study such remnants of the Kamchadal language and folk-lore as might still exist in some remote villages, and then to return to Anadyr in time for a journey northward.

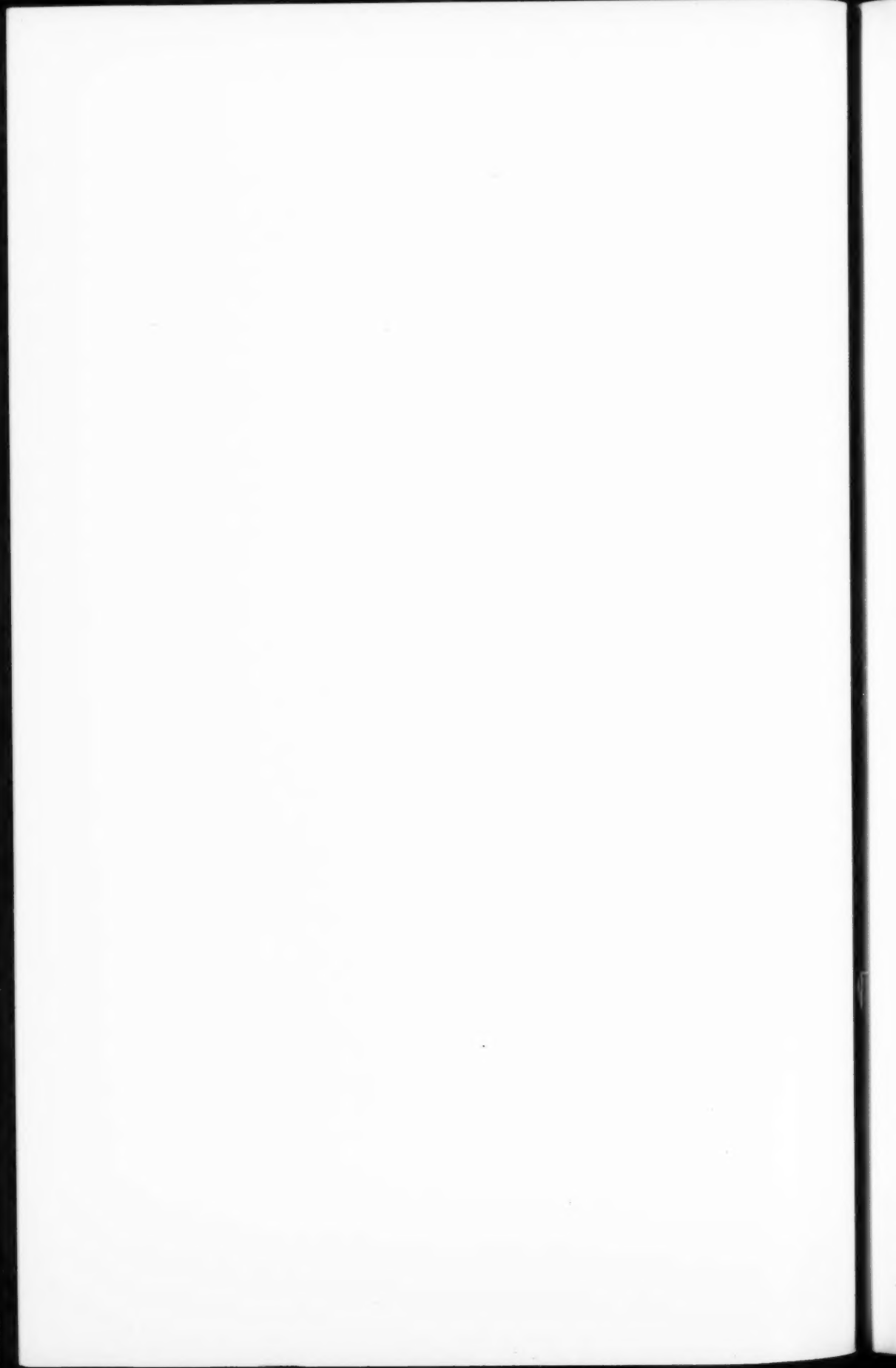
I spent the first four months of my field-work at the mouth of the Anadyr, visiting the camps of the Reindeer Chukchee, which during the summer are scattered on the seashore. I made collections and took photographs and anthropometrical measurements. During this time I also made a study of the language of the Ai'wan tribe, which forms the main branch of the Asiatic Eskimo. In this I had the aid of two Ai'wan families who live with the Chukchee at Mariinsky Post. The conditions of the summer were rather unfavorable. An epidemic of measles brought by a Russian trader from Vladivostok to Kamchatka the previous year swept along the shores of the Sea of Okhotsk and of Bering Sea, carrying away hundreds of victims. In some places the fatality amounted to about thirty per cent. of the whole population. In the summer of 1900 it reached the Pacific shore of the Chukchee Peninsula, where the loss of life was just as considerable. Therefore the summer fair which is held at Mariinsky Post early in August every year was not visited in 1900 by any of the native traders from the northern Chukchee and the Eskimo villages.

About the end of October, a considerable time after the freezing of the Anadyr River, I left Mariinsky Post, together with one of my Cossacks, bound for the village of Markova on the middle Anadyr, from there to Kamenskoye on the Okhotsk Sea. From that period till the end of my field-work I spent my time in continuous travel, and did not remain at any one place more than three or four weeks. Mrs. Bogoras staid on the Anadyr till the next summer, traveling between Mariinsky Post and Markova, and making the greater part of the collections for the Museum, while I spent my time chiefly in collecting scientific information. She was assisted by Mr. Axelrod, whom Mr. Jochelson sent to Mariinsky Post from Kamenskoye.

We traveled almost exclusively with dogs, several of which I bought from the natives, picking out the best, and from time to time exchanging for fresh ones those that became unfit for further travel. Of these dogs I formed three teams, which allowed us to travel fast enough, when the weather and the conditions of the snow were favorable. We could carry no heavy loads, however, and had to leave everything behind except our scientific instruments and a few objects for barter. This obliged us to rely almost wholly on the food-supply



MARKOVA, ON ANADYR RIVER, SIBERIA, MOST EASTERN TOWN OF RUSSIA. VISITED BY MR. BOGORAS



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of the country, and during the whole time we lived on dried fish, reindeer-meat, seal and walrus blubber etc. I found it more difficult to get food for my dogs than for ourselves especially in the spring, when food is scarce in the maritime villages. Thus we were obliged to carry some dog-food all the time, which lessened still more our carrying-capacity for other purposes. In traveling I was usually accompanied by one Cossack and a native guide. Each of us drove his own team of twelve animals.

The winter of 1900-01 was very severe in the Anadyr country. It began with heavy snowfalls, which were followed by a general thaw. The moss pastures were covered with a crust of ice, and thus the reindeer herds were half starved because they could not break the ice with their hoofs. Therefore the winter fairs were sparsely attended, the people remaining scattered all around the country, unable to undertake any extensive journeys. Blizzards were frequent, and directly after leaving Mariinsky Post we were overtaken by one which lasted several days and spoiled the track to such a degree that our dogs were hardly able to drag themselves through the deep snow. We had to make the greater part of the journey to Markova on snow-shoes and assist our teams in dragging the sledges.

I reached Kamenskoye after a month's journey, and found Mr. and Mrs. Jochelson there. Near the end of December, after four weeks' stay, I left Kamenskoye, and went across the plateau of Parapolsky Dol to the first villages of the Kamchatka Koryak, and thence to the villages of the western Kamchadal, on the west coast of the Kamchatka Peninsula. There, in eight villages, I found that the Kamchadal language was still spoken, though rapidly giving way to Russian. The language was found to belong to the same stock as the Chukchee and the Koryak. In several details the Kamchadal language appears to be more complicated and probably more ancient than the two northern dialects.

About the end of February I left Kamchatka and started on my return journey to the Anadyr, along the Pacific coast, through a part of the country hitherto wholly unknown and unexplored. The journey had to be made hurriedly, because I had to reach Mariinsky Post on March 25, since I had left directions with the Anadyr branch of the expedition to have everything ready by that time for a journey northwards. Unfortunately I was taken ill with influenza in one of the Kamchatka villages and lost my voice temporarily, so that I could communicate with the natives only by means of signs during

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more than a fortnight. At one time, indeed, my illness became so alarming, that the Cossack, who also felt responsible for the success of the expedition, asked me for instructions as to which way to carry my body and my "official papers" in case I should die on the route. I ordered him to tie up everything in curried leather, and to take it with all possible despatch to the Anadyr.

My route lay across the border-line between the Koryak and the Chukchee reindeer-breeders, who in former times were involved in continuous warfare with each other, and then along the line of Kerek villages. The latter are a branch of the Maritime Koryak, who live in the most remote part of the country, which is very poor in natural resources. In former times they lived chiefly on walrus; but within the last few decades, *i. e.*, since the arrival of American whalers has driven the walrus farther to the north, they have been rapidly dying out from continual starvation.

Between the Kerek villages and the first camps of the Anadyr Reindeer Chukchee lies an uninhabited, mountainous country. It is unknown to the Kerek, who therefore could not supply us with guides, and we had to pass through it, guided solely by the course of the frozen mountain rivers up to the watershed, and then down to the tributaries of the Anadyr. This journey lasted seventeen days, and nearly exhausted the strength of both dogs and drivers.

I reached Mariinsky Post on March 26, and after a stay of two weeks started northward with a party of native traders, who were returning from the annual traffic with the Anadyr Cossacks. I was accompanied by Mr. Axelrod and four Russianized natives with extra teams, carrying provision and wares for barter. During this journey Mr. Axelrod made a survey of the overland route. A journey of four weeks brought us to Indian Point, where we staid about a month, during which time I made a boat journey to St. Lawrence Island. My studies at that place were devoted to the Maritime Chukchee and Asiatic Eskimo.

At the end of June I started on my return journey towards the mouth of the Anadyr. For this purpose I bought the frame of a native boat and had it covered with walrus hides. Our journey in this boat lasted thirty-two days, and we arrived at Mariinsky Post on July 28, 1901, ten days before the arrival of the annual postal steamer which took us back to Vladivostok. From there I shipped our collections to New York by way of Suez, while we returned over the Trans-Siberian Railway to St. Petersburg. There I was unfor-

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unately taken ill, and was unable to return to New York until April 17, 1902.

The results of this work are studies of the ethnography and anthropology of the Chukchee and Asiatic Eskimo, and partly of the Kamchadal and of the Pacific Koryak. These studies are illustrated by extensive collections, embracing five thousand ethnographical objects, thirty-three plaster casts of faces, seventy-five skulls and archæological specimens from abandoned village sites and from graves. Other material obtained includes three hundred tales and traditions; one hundred fifty texts in the Chukchee, Koryak, Kamchadal and Eskimo languages; dictionaries and grammatical sketches of these languages; ninety-five phonographic records, and measurements of eight hundred sixty individuals. I also made a zoölogical collection and kept a meteorological journal during the whole time of my field-work.

The investigators who took part in the field-work of the expedition are all engaged in studies of the materials collected. Some of the results have been published, but much remains to be done. It is of course premature to draw any final conclusions from the materials collected, because the greater part is not yet available for purposes of comparison, and the investigation of the anthropometrical material has not even been taken up. It seems clear, however, even at this time, that the isolated tribes of eastern Siberia and those of the northwest coast of America form one race, similar in type, and with many elements of culture in common. It would seem that the unity of race was much greater in former times than it is now; that the invasion of eastern tribes in America, such as the Eskimo, Athapaskan and Salish, and of western and southern tribes in Asia, such as the Yakut and Tungus, have disturbed the former conditions. Nevertheless enough remains to lead us to think that the tribes of this whole area must be considered as a single race, or at least that their culture is a single culture, which at one time was found in both the northeastern part of the Old World and the northwestern part of the New World. Thus the Jesup Expedition seems to have established the close relationship between the peoples of Asia and America.

THE AMERICAN MUSEUM JOURNAL

THE following Museum memoirs have been published, embodying results obtained by the Jesup North Pacific Expedition. The number of the volume is that which each bears in the series of Museum memoirs.

Vol. II. Anthropology.

PART I. — Facial Paintings of the Indians of Northern British Columbia. By Franz Boas. Pp. 1-24, pll. i-vi. June 16, 1898.

PART II. — The Mythology of the Bella Coola Indians. By Franz Boas. Pp. 25-127, pll. vii-xii. November, 1898.

PART III. — The Archæology of Lytton, British Columbia. By Harlan I. Smith. Pp. 129-161, pl. xiii, and 117 text figures. May, 1899.

PART IV. — The Thompson Indians of British Columbia. By James Teit. Edited by Franz Boas. Pp. 163-392, pll. xiv-xx, and 198 text figures. April, 1900.

PART V. — Basketry Designs of the Salish Indians. By Livingston Farrand. Pp. 393-399, pll. xxi-xxiii, and 15 text figures. April, 1900.

PART VI. — Archæology of the Thompson River Region. By Harlan I. Smith. Pp. 401-442, pll. xxiv-xxvi, and 51 text figures. (With title-page, contents, and index to Vol. II.) June, 1900.

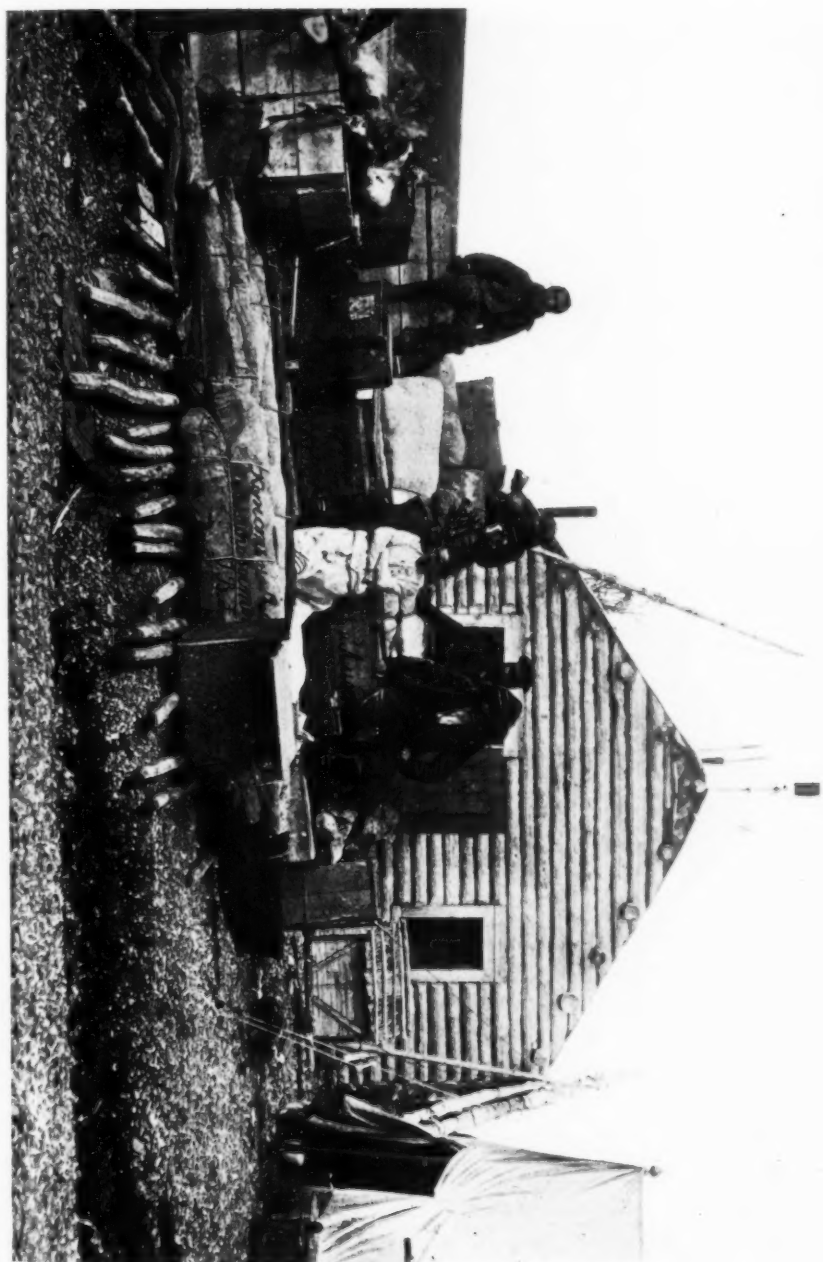
Vol. IV. Anthropology (not yet completed).

PART I. — Traditions of the Chilcotin Indians. By Livingston Farrand. Pp. 1-54. June, 1900.

PART II. — Cairns of British Columbia and Washington. By Harlan I. Smith and Gerard Fowke. Pp. 55-76, pll. i-v, and 9 text figures. January, 1901.

PART III. — Traditions of the Quinault Indians. By Livingston Farrand, assisted by W. S. Kahnweiler. Pp. 77-132. January, 1902.

PART IV. — Shell-Heaps of the Lower Fraser River. By Harlan I. Smith. Pp. 133-190, pll. vi, vii, and 59 text figures. December, 1902.



MARINSKY POST, SIBERIA. COLLECTIONS OF JESUP NORTH PACIFIC EXPEDITION READY FOR SHIPMENT

THE AMERICAN MUSEUM JOURNAL

Vol. V. Anthropology (not yet completed).

PART I. — Kwakiutl Texts. By Franz Boas and George Hunt. Pp. 1-270. January, 1902.

PART II. — Kwakiutl Texts (continued). Pp. 271-402. December, 1902.

Vol. VII. Anthropology (not yet completed).

PART I. — The Decorative Art of the Amur Tribes. By Berthold Laufer. Pp. 1-79, pll. i-xxxiii, and 24 text figures. January, 1902.

ETHNOGRAPHICAL ALBUM.

Ethnographical Album of the North Pacific Coasts of America and Asia. Part I, pp. 1-5, pll. 1-28. August, 1900.

Among those in preparation are:

Vol. IV, Part V. — The Lillooet of British Columbia. By James Teit.

Vol. VII, Part II. — The Chukchee. By Waldemar Bogoras.

Vol. VIII, Part I. — The Haida of Queen Charlotte Islands, B. C. By John R. Swanton.

Ethnographical Album of the North Pacific Coasts of America and Asia. Part II.

NEWS NOTES



THE Department of Vertebrate Palæontology has recently received two very handsome gifts: the skull of the white rhinoceros of Africa from J. Pierpont Morgan, Esq.; and casts of the skull, brain cavity and foot of two species of *Uintatherium*, a cast of the skull and jaw of *Brontops robustus* and a cast of the skeleton of *Anchisaurus*, presented by the Yale University Museum through Professor Charles E. Beecher.

PROFESSOR J. E. DUERDEN, Honorary Curator of Coelenterates, who has spent the past year as interim professor of biology

THE AMERICAN MUSEUM JOURNAL

at the University of North Carolina, was at the Museum for a few days in July, on his way to England. He will spend the next academic year at the University of Michigan, as acting assistant professor of zoölogy.

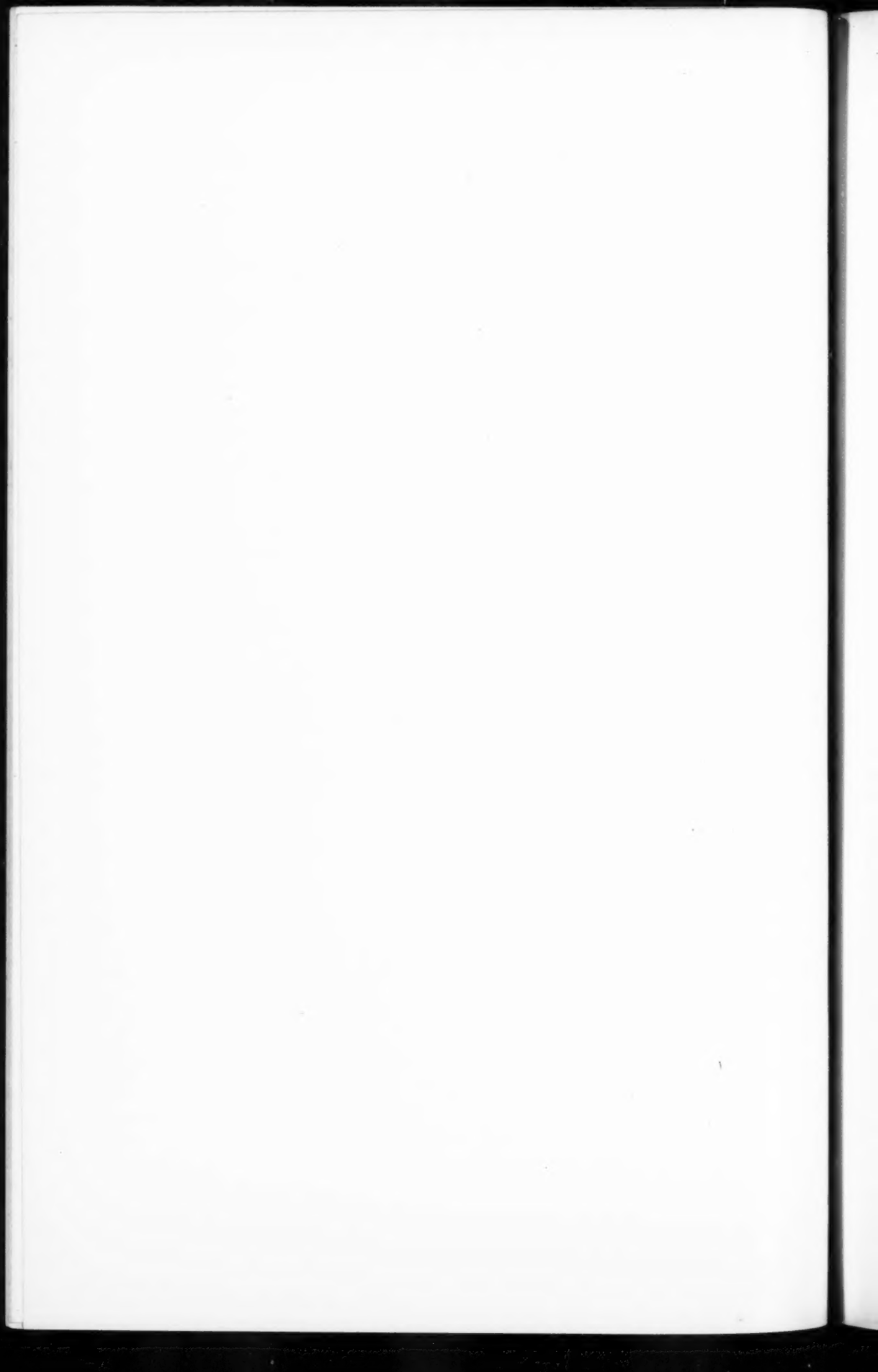
PROFESSOR HENRY FAIRFIELD OSBORN spent several weeks in August and September visiting the various places in the West, where the Department of Vertebrate Palæontology has been carrying on field work during the past season. These localities, as stated in the July number of the JOURNAL, were Fort Bridger and vicinity, Reed and Bone Cabin Quarries in Wyoming, and the southwestern part of South Dakota.

DR. E. O. HOVEY of the Department of Geology visited Vienna in August to represent the Museum at the ninth triennial meeting of the International Geological Congress. He gave a public lecture before the congress on the recent volcanic eruptions on the islands of Martinique and St. Vincent.

MR. FRANK M. CHAPMAN's quest for birds and accessories in California, mentioned in the last number of the JOURNAL, was very successful and he brought back to the Museum a large amount of material from which groups will be constructed for our exhibition halls, as well as specimens for the research collections and numerous photographs.

MR. W. BEUTENMÜLLER's expedition to North Carolina in May and June for insects was very successful. A full account of the trip may be expected in a future number of the JOURNAL.





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The Publications of the Museum consist of an Annual Report, in octavo, about 80 pages; the Bulletin, in octavo, of which one volume, consisting of about 400 pages, and about 25 plates, with numerous text figures, is published annually; the Memoirs, in quarto, published in parts at irregular intervals; an Ethnographical Album, issued in parts, and the American Museum Journal, published quarterly.

The American Museum Journal

EDMUND OTIS HOVEY, *Editor*

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Subscription, One Dollar per year.

A subscription to the JOURNAL is included in the membership fees of all classes of Members of the Museum.

For sale at the Museum at twenty-five cents per copy

Subscriptions should be addressed to The Editor, American Museum Journal, American Museum of Natural History, 77th St. and Central Park West, New York City.

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The Knickerbocker Press, New York

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AMERICAN MUSEUM OF NATURAL HISTORY

The Collection of Fossil Vertebrates



BY

W. D. Matthew, Ph.D.

Associate Curator of Vertebrate Paleontology

SUPPLEMENT TO AMERICAN MUSEUM JOURNAL

VOL. III, No. 5, OCTOBER, 1903

Guide Leaflet No. 12

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The Collection of Fossil Vertebrates

A Guide Leaflet to the Exhibition Halls
of
Vertebrate Palæontology
in the
American Museum of Natural History

By
W. D. MATTHEW, Ph.D.
Associate Curator, Department of Vertebrate Palæontology

PUBLISHED BY THE MUSEUM
AS SUPPLEMENT TO THE AMERICAN MUSEUM JOURNAL
VOL. III, No. 5, OCTOBER, 1903
Guide Leaflet No. 12

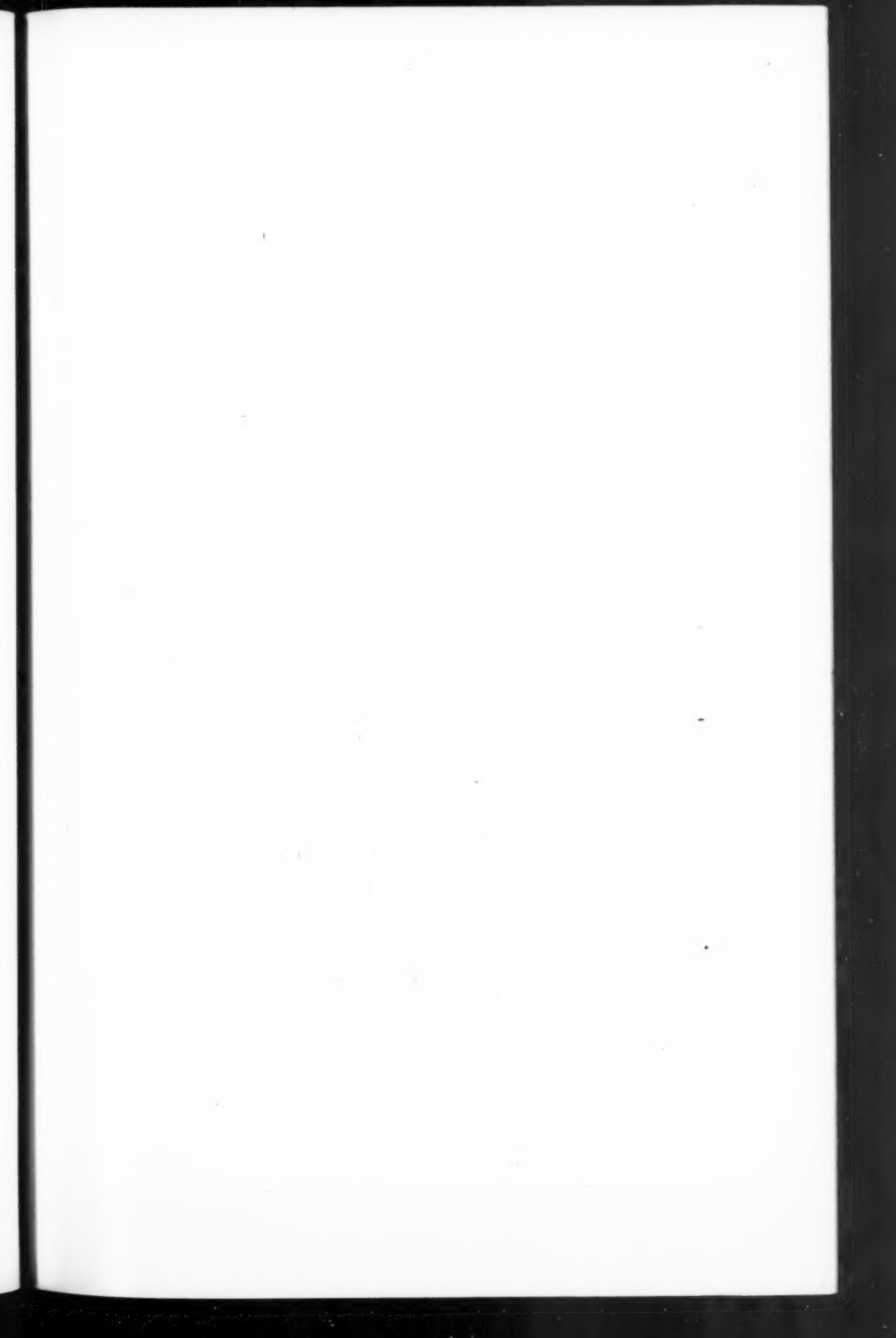
PREFATORY NOTE

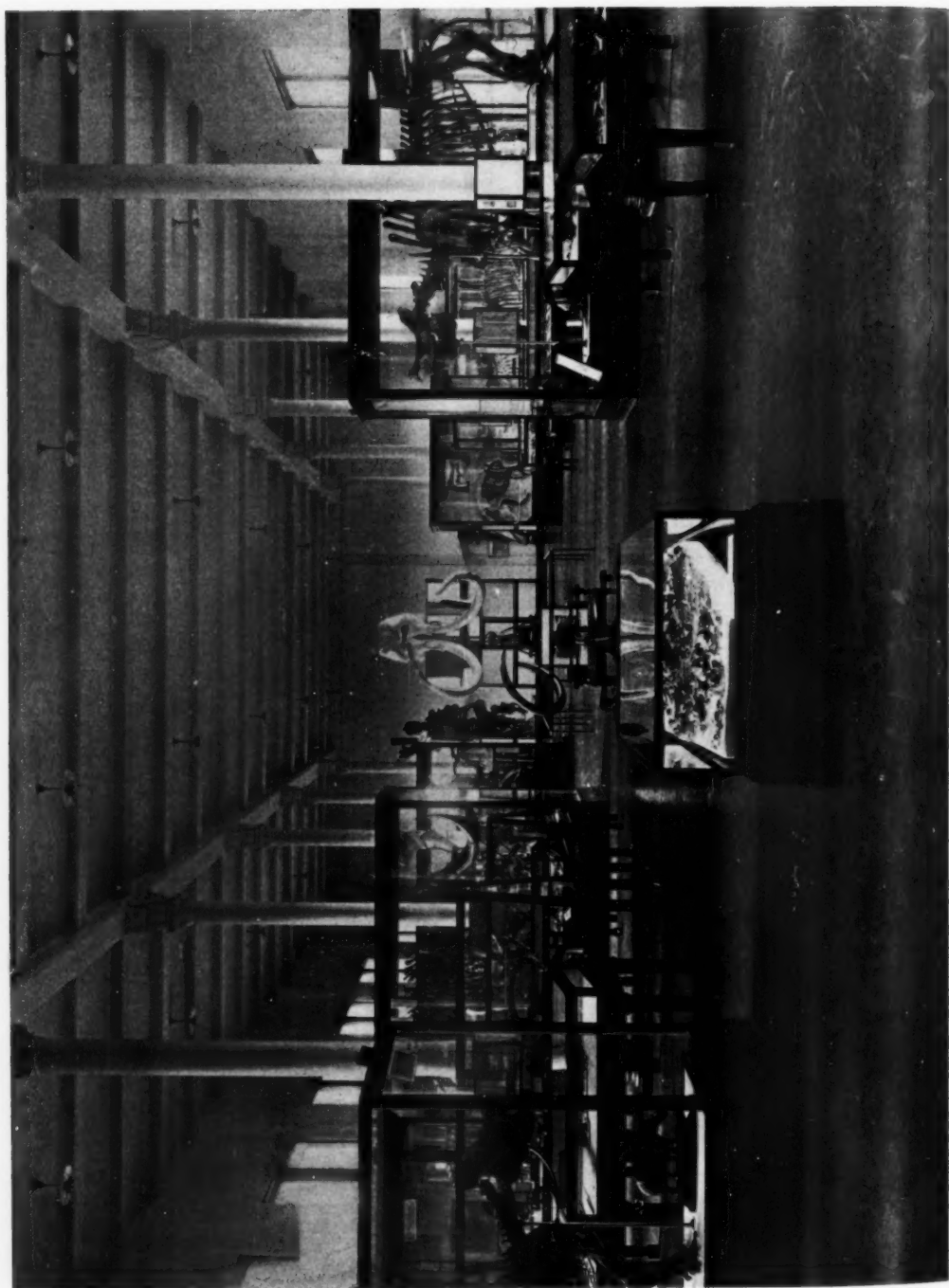
THE COLLECTION of fossil vertebrates belonging to the American Museum of Natural History comprises the extensive material collected by the late Professor E. D. Cope chiefly between 1870 and 1890 and the much larger collections made by the expeditions which have been sent out by the Museum every year, beginning with 1891. Most of the Museum expeditions have worked in the western States.

From the beginning of the department in 1891 the collection and exhibition of these fossils have been under the direction of Professor Henry Fairfield Osborn, the curator. From 1891 to 1898, inclusive, the exploring parties in the field were under the immediate supervision of Dr. J. L. Wortman. Since that time Messrs. Matthew, Granger, Brown and Gidley have been in charge of the field work.

The funds necessary for sending out the expeditions and for the purchase of the Cope Collection have been furnished chiefly by President Jesup and Messrs. Osborn, Whitney and Constable. The exhibit illustrating the evolution of the Horse is mostly the gift of Mr. William C. Whitney.

EDITOR.





HALL OF FOSSIL MAMMALS

THE COLLECTION OF FOSSIL VERTEBRATES.

By W. D. MATTHEW, Ph.D.,

Associate Curator, Department of Vertebrate Palæontology.

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INTRODUCTION.

WHEN we dig beneath the present surface of the ground we sometimes find remains of ancient cities, dwellings, bones of men and animals, buried many centuries ago under accumulations of débris, deposits of river mud or drifted sand. From these have been gleaned many facts concerning the early history of mankind of which there is no written chronicle. From the study of these facts the science of Archæology has arisen, the science which deals with the early history of mankind, with the evolution of civilization.

Most of the lower animals of which the archæologist finds traces are like those now living, although a few have become extinct. But in those more ancient deposits which are now consolidated into clays, sandstones etc., indica-

tions of man are not found, and the remains of lower animals which they contain are unlike any now living—the more unlike as the rock is more ancient. These remains are called *fossils*. They consist only of the hard parts of animals (bones, shells, spines etc.). The soft parts are never preserved, and only very rarely is some trace of skin or hair, horns or hoofs, to be distinguished. As in the course of ages the mud or sand in which they are buried changes to rock, so little by little the fossils have been changed by heat, pressure and especially by the slow infiltration of mineralized waters into brittle, stony material, while retaining their outward form and usually their peculiar structure. But mud and clay, in changing into rock, settle down and contract considerably, and the fossils are flattened out correspondingly, sometimes to such a degree, in the case of a rock which has once been a soft, oozy mud, that they suggest rather a picture or a bas-relief than the original form of the animal. The fossil skeletons of marine reptiles and fishes on the walls of the corridor hall and in the case opposite the elevator have been flattened out in this manner, especially the Ichthyosaur skeletons.

From fossils we can interpret the history of the world of life during the long ages before man appeared. The science which **Science of** deals with the ancient history and evolution of the **Palæon-** animal kingdom is Palæontology (*παλᾱίος*, ancient, **tology.** *ὄντα*, living beings, *-λογία*, science). It tells us of a long period of time before Man appeared, probably millions of years, during which Mammals of great size and unfamiliar form were the dominant animals—of a yet longer era before that, during which huge Reptiles were rulers of earth, sea and air—and of other still more ancient periods during which Amphibians, Fish and Invertebrate Animals held sway in turn. Vertebrate Palæontology deals only with the higher classes of fossil animals, the Vertebrata, or those that have backbones (fish, amphibians, reptiles, birds and mammals).

Earth-history or geological time has been divided into many **Geological** parts according to the evidence furnished by the rocks **Time.** and the fossils contained therein. The principal subdivisions are shown in the accompanying table:



FOSSIL SKELETONS IN THE ROCK

This slab of soft chalky clay contains five skeletons of an extinct animal. One is an old male, the other four are young

THE COLLECTION OF FOSSIL VERTEBRATES

GEOLOGICAL ERAS, PERIODS AND AGES.

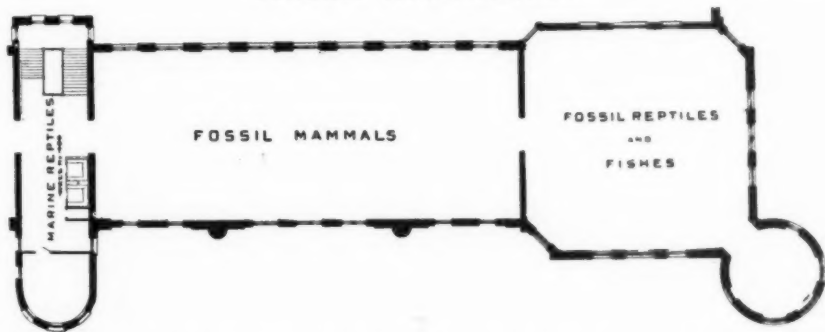
Eras.	Periods.	Ages.
Cenozoic	Quaternary	Age of Man, 50,000 years
	Tertiary	Age of Mammals, 3,000,000 years
Mesozoic	Cretaceous	Age of Reptiles, 7,000,000 years
	Jurassic	
	Triassic	
Palæozoic	Permian	Age of Amphibians and Coal Plants, 5,000,000 years
	Carboniferous	
	Devonian	Age of Fishes, 2,000,000 years
	Silurian	Age of Invertebrates, 10,000,000 years
	Cambrian	
Eozoic	Algonkian	(No fossils)
	Archæan	

The estimates in years of the geological periods given in this table, which is arranged in descending order from the most recent to the most ancient time, must be understood to be merely very rough approximations. There is no known method of finding any exact equivalent in years of any geological period, although the relative length of each to each is much more nearly known. The estimates given herewith are based on the careful study of the subject made by C. D. Walcott, Director of the U. S. Geological Survey. In concluding his discussion Dr. Walcott stated his belief that the duration of geological time (the entire period included in this table) might be measured by tens of millions of years, but not by single millions or by hundreds of millions.

To give the visitor a clear idea of these extinct animals, the skeletons usually have been removed entirely from the rock in which they were found and have been mounted as much as possible like skeletons of modern animals. To mount a petrified skeleton in this manner is a very difficult matter, for such skeletons are rarely perfect, and the bone is always very brittle and more or less shattered and crushed out of shape. In the mounted skeleton the missing parts have been restored in tinted plaster, modeled from other individuals or from nearly related animals in which these parts are known. The outlines of the restored parts of bones are marked off with red lines, while entire bones modeled in plaster are marked with a red cross, or with a red circle if supplied from other individuals. All the skeletons are original specimens except the *Megatherium* at the far end of the hall; and all are of extinct animals except a few which are placed with the others for comparison. With each fossil skeleton will be found, besides a descriptive label, a small model and a water-color restoration of the animal, showing its probable appearance during life and indicating its supposed habitat. The transparencies in the windows show the localities where the fossils are found, chiefly in the Bad-lands of the western States.

How Fossil
Skeletons
are
Mounted.

GENERAL ARRANGEMENT.



The collections are arranged to illustrate the geological history and evolution of the different groups of Vertebrata, especially those of North America. They fill two large halls and a corridor.

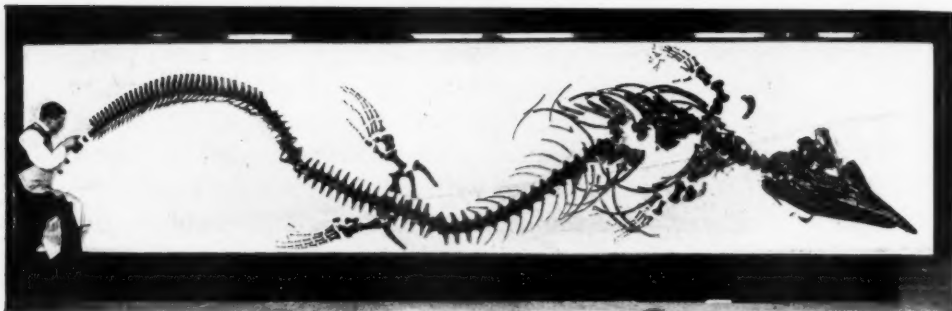
General Arrangement
of Collections.

East Wing. Hall No. 406. Fossil Mammals.

East Wing. Hall No. 407. Fossil Reptiles, Amphibians and Fishes.

In addition

East Corridor, No. 405 (in which are the elevator and stairways), contains fossil Marine Reptiles and Fishes of the Age of Reptiles.



SKELETON OF THE GREAT MARINE LIZARD IN THE EAST CORRIDOR

THE EAST CORRIDOR. No. 405.

On stepping from the elevator the visitor sees before him a case filled with skulls and skeletons of the marine reptiles and fishes which inhabited the great inland sea that once spread over the center of the North American continent, from Canada to Mexico. The reptiles were of kinds now long extinct, *Plesiosaurs* with long snaky neck, short bulky body with long flippers and stubby tail, and *Mosasaurus* with short neck and longer tail. Some of the fishes were ancestors, collateral or direct, of certain modern fishes, others belonged to groups now extinct. These animals lived and died, their carcasses sank to the bottom of the sea, and were buried in whatever sediment was being deposited there—soft white ooze in the open sea, dark gray or black mud nearer the shores. In the course of ages this ooze or mud settled gradually and consolidated into chalk or shale. Afterwards as the continent rose above the waters and assumed more nearly its present dimensions, the rivers flowing over the broad plains excavated

The Preservation of Fossils in the Rocks.



HUNTING FOR FOSSILS IN THE BAD-LANDS
Members of the American Museum Expedition of 1894 in the Uinta Basin, Utah

broad shallow valleys in the chalk and shale. In the dry climate of the present day the sides of these valleys often are bare rock, carved by wind and the infrequent storm-bursts of rain into the fantastic maze of cliffs and winding cañons known as "bad-lands." Here and there, projecting from an outstanding ledge or trailing in fragments down some crumbling slope, a fossil bone may be seen by the trained eye of the collector as he searches along the rock exposures; and quarrying in around the bone he is sometimes rewarded by a skull, sometimes by a string of vertebræ, occasionally by a whole skeleton, buried in the rock except for such parts of it as have been weathered out and washed away.

To excavate the fossil without damaging the brittle bones, buried as they are in a weak and shattered mass of heavy shale or chalk, is a slow and delicate operation, requiring special methods and considerable care and skill. Then the specimen must be packed, and sent in to the Museum, where the rock is removed and the specimen is prepared for exhibition. When the bones are as much crushed and distorted as those represented in the photograph (page 10) the matrix is removed from one side only, and the specimen is thus placed on exhibition.

Temporarily placed in the bottom of the case is a large Plesiosaur skeleton, only partly removed from the rock. This specimen unfortunately lacks the skull. Beside the lower stairway is a Mosasaur skeleton, the finest specimen of its kind ever found, and above it is a large fish skeleton which was found in the same strata in western Kansas. Beside the upper stairway are three skeletons of Ichthyosaurs, another long extinct group of marine reptiles, of fish-like appearance, paralleling the modern Whales among mammals.

EAST WING. HALL NO. 406. FOSSIL MAMMALS.

The ancestors of our modern quadrupeds are to be found in the East Wing, No. 406, together with many extinct races more or less nearly related to them. All the fossil specimens of each group of mammals are placed together in one alcove, where they have been arranged according to their geological age. Thus all the fossil Horses, direct

THE AGE OF MAMMALS

(CENOZOIC, OR TERTIARY AND QUATERNARY.)

WESTERN LAKE BASINS and CHARACTERISTIC MAMMALS

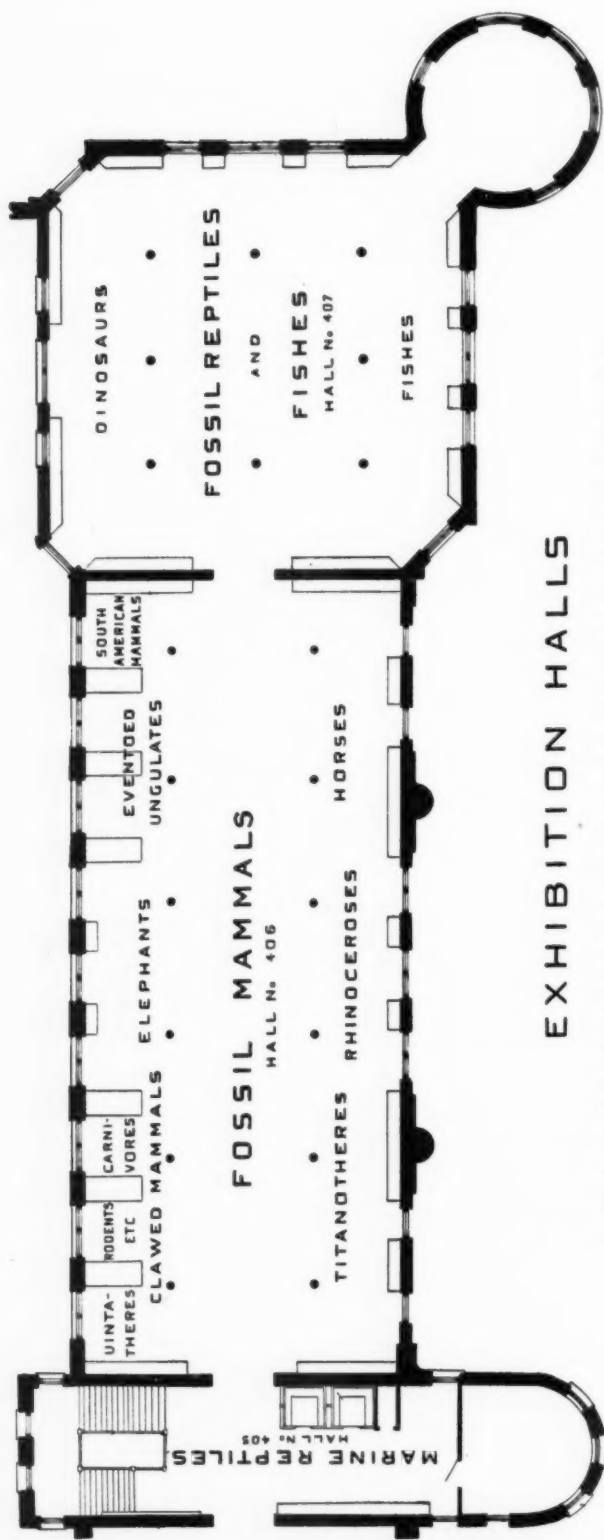
THE TERTIARY FORMATIONS ARE REPRESENTED IN WESTERN AMERICA BY A SERIES OF DEPOSITS FORMED ON THE BOTTOMS OF SUCCESSIVE FRESH-WATER LAKES. THEIR TOTAL THICKNESS IS NEARLY 15000 FEET, REQUIRING PROBABLY TWO OR THREE MILLION YEARS TO FORM.

IN THE BEDIMENTS OF THESE LAKES WERE BURIED THE REMAINS OF MANY OF THE ANIMALS WHICH LIVED AROUND THEIR SHORES, LEAVING THUS A RECORD OF THE SUCCESSIVE SPECIES WHICH INHABITED THE LAKE REGION.

PERIODS	LAKE BASINS	THICKNESS	CHARACTERISTIC MAMMALS
RECENT AND PLEISTOCENE	EQUUS AND MEGALONYX	150	ELEPHANTS, LAST MASTODONS, LAST GROUND SLOTHS, LAST SABRE-TOOTH TIGERS, CAMELS, ONE-TOED HORSES, CAVE BEARS, PECCARIES, TAPIOIDS, DOGS, WOLVES, FOXES, RABBITS.
	BLANCO AND PALO DURO	150	GROUND SLOTHS, CAMELS, ONE-TOED HORSES, FIRST HORSES, FIRST TRUE CATS, PECCARIES, FOXES.
	LOUP FORK	400	MASTODONS, TRUE HORSELESS RHINOCEROSSES, LAST CREODONTS, CAMELS, THREE-TOED HORSES, DEER, FIRST PROBO-HORN ANTELOPES.
	DEEP RIVER	150	TRUE HORSELESS RHINOCEROSSES, CREODONTS, CAMELS, FIRST MASTODONS, FIRST TRUE DEER.
MIOCENE	JOHN DAY (OREGON, NEVADA)	1000	HORSELESS AND TWIN HORNED RHINOCEROSSES, LAST ELOTHERES, CREODONTS, PRIMITIVE CAMELS, PRIMITIVE DEER, RODENTS, DOGS, WOLVES, FOXES, CATS, SABRE-TOOTH TIGERS.
	WHITE RIVER (NEV., S. DAK., N. DAK., COL., CANADA)	1000	HYPOPTAMIDS, PROTODERMS, PECCARIES, LAST CREODONTS, DOGS, CATS, HORSE, ELOTHERES, CYBODONAL RHINOCEROSSES, TAPIOIDS, FIRST THREE-TOED HORSES, MEGALOPHIDS, SWIMMING RHINOCEROSSES (AMYNODONTES), LAST TITANOTHERES, CREODONTS, FIRST TRUE HORSELESS RHINOCEROSSES, PRIMITIVE DEER, LAST PRIMATES, RODENTS, INSECTIVORES.
OLIGOCENE	UTAH	800	PRIMITIVE RHINOCEROSSES and AMYNODONTES, TITANOTHERES, ELOTHERES, CREODONTS, FIRST CAMELS, FIRST CREODONTS, TAPIOIDS, FOUR-TOED HORSES, PRIMATES, RODENTS, LAST UINATHERES, DOG-LIKE CREODONTS (MACH).
	BRIDGER (WYOMING, UTAH)	2000	UINATHERES, TITANOTHERES (MACHODONTES, TITANOTHELIUM), PRIMITIVE RHINOCEROSSES (MYRACHYUS), FIRST ELOTHERES (ACHEMODON), LARGE CREODONTS (MEGONYX), CAT-LIKE PRIMATE (MACH) and DOG-LIKE (MACH) CREODONT, FIRST BELLESCONT ARTHRODONTYLUS (MACHACON), FOUR-TOED HORSES (UROSPHUS), LAST PRIMITIVE GROUND SLOTHS, PRIMATES, RODENTS, BATS, LAST TILLODONTES.
	WIND RIVER (WYOMING)	800	LAST CORYPHODONS, FIRST UINATHERES, FIRST TITANOTHERES, LAST CONDYLARTHUS, FOUR-TOED HORSE (PROTODIPPOUS), PRIMATES, CREODONTES, RODENTS, BATS, TILLODONTES.
	WASATCH (WYOMING, NEW MEXICO)	2000	AMBLYPODS (CORYPHODON), CONDYLARTHUS (PHENACODUS), FIRST FOUR-TOED HORSES (HYRACOTHERIUM), FIRST TAPIOIDS (SYSTEMODON), FIRST ARTHRODONTYLUS or CLOVEN-HOOFED ANIMALS, PRIMATES (MONKEYS or LEMURS), CREODONTES or PRIMITIVE CARNIVORES, (RESEMBLING CATS, DOGS AND BEARS), FIRST RODENTS, TILLODONTES, INSECTIVORES, PRIMITIVE GROUND SLOTHS.
EOCENE	TORREJON (NEW MEXICO)	300	CONDYLARTHUS, PHENACODONTES, AMBLYPODS, CREODONTES, PRIMITIVE EDENTATES, FIRST PRIMATES, LAST MULTITUBERCULATES.
	PUERCO (NEW MEXICO)	500	CONDYLARTHUS or PRIMITIVE HOOFED MAMMALS, CREODONTES or PRIMITIVE CARNIVORES, MULTITUBERCULATES (MONOTREMES), PRIMITIVE EDENTATES, GROUND SLOTHS.
AGE OF REPTILES CRETACEOUS	LARAMIE	5000	

DIVISIONS OF THE AGE OF MAMMALS

Characteristic fossil mammals, and the geological formations in which they are found



or collateral ancestors of the modern Horses, Asses and Zebras, are in one alcove, arranged in series from the most ancient to the most recent. The most ancient and structurally primitive groups of mammals come first, the most modern and familiar types come last.

SOUTH (RIGHT) SIDE.		NORTH (LEFT) SIDE.	
Perissodactyls or Odd-Toed Hoofed Mammals	TITANOTHERES	AMBLYPODS	} Primitive Hoofed
	Chalicotheres	CONDYLARTHS	} Mammals
		Monkeys, Bats, Rodents, Insectivores and other Small Primitive Mammals	
		Marsupials	
		CREODONTS	} Carnivorous
		CARNIVORES	} Mammals
		Seals, Dolphins, Whales,	} Marine
		Sirenians etc.	} Mammals
	Tapirs	MASTODONS and	} Proboscideans
	Lophiodonts	ELEPHANTS	
	RHINOCEROSSES	ELOTHERES	Artiodactyls or Even-Toed Hoofed Mammals
		Anthracotheres	
		Pigs and Peccaries	
		OREODONTS	
		CAMELS	
	Palaeotheres	DEER etc.	
		Litopterna	Fossil Mammals Peculiar to South America.
	HORSES	Toxodontia	
		Typotheria	
		EDENTATA	

SOUTH (RIGHT) SIDE.

The south side of the hall is entirely devoted to the PERISSODACTYLS or Odd-Toed Hoofed Mammals in which the number of toes (in the hind foot and generally in the forefoot) is either 1, 3 or 5, while in the other main division of hoofed animals, the Artiodactyls, it is either 2 or 4; or more exactly, the axis of symmetry of the foot passes through the central toe in Perissodactyls, while in Artiodactyls it passes between two toes.

The TITANOTHERES come first in the series of Perissodactyla, large animals which suggest rhinoceroses in general proportions, but have a differently shaped head and peculiar teeth. These began as hornless animals of moderate size (Cases 1 and 17) and increased in size and developed large bony horns (Cases 3, 5 and 19) before they

South Al-
cove 1,
Titan-
otheres

became extinct. The Titanotheres occupy the first of the three main alcoves into which the south side of the hall is divided.

The second alcove is devoted to the RHINOCEROSSES, which



RESTORATION OF TITANOTHERIUM, AN EXTINCT HOOVED MAMMAL OF WESTERN AMERICA

The picture shows a bull, a cow and a calf

From the original water-color, based on mounted skeleton and skulls in American Museum of Natural History

were very common beasts in North America as well as in the Old South World during the Tertiary period. They also began in the Eocene as small hornless animals (*Hyrachyus*, Case 7), but diverged in the Oligocene into cursorial, aquatic and true (terrestrial) Rhinoceroses of which the two former soon became extinct. True Rhinoceroses also became extinct in America by the Pliocene epoch, while in the Old World several of them have survived to the present day.

Third Alcove. HORSES.¹ This fine exhibit is due chiefly to

¹ For more detailed information regarding the evolution of the Horse, see Guide Leaflet No. 7, "The Evolution of the Horse." Published January, 1903.



MOUNTED SKELETON OF THE TITANOTHERE, FROM THE BIG BAD-LANDS OF SOUTH DAKOTA

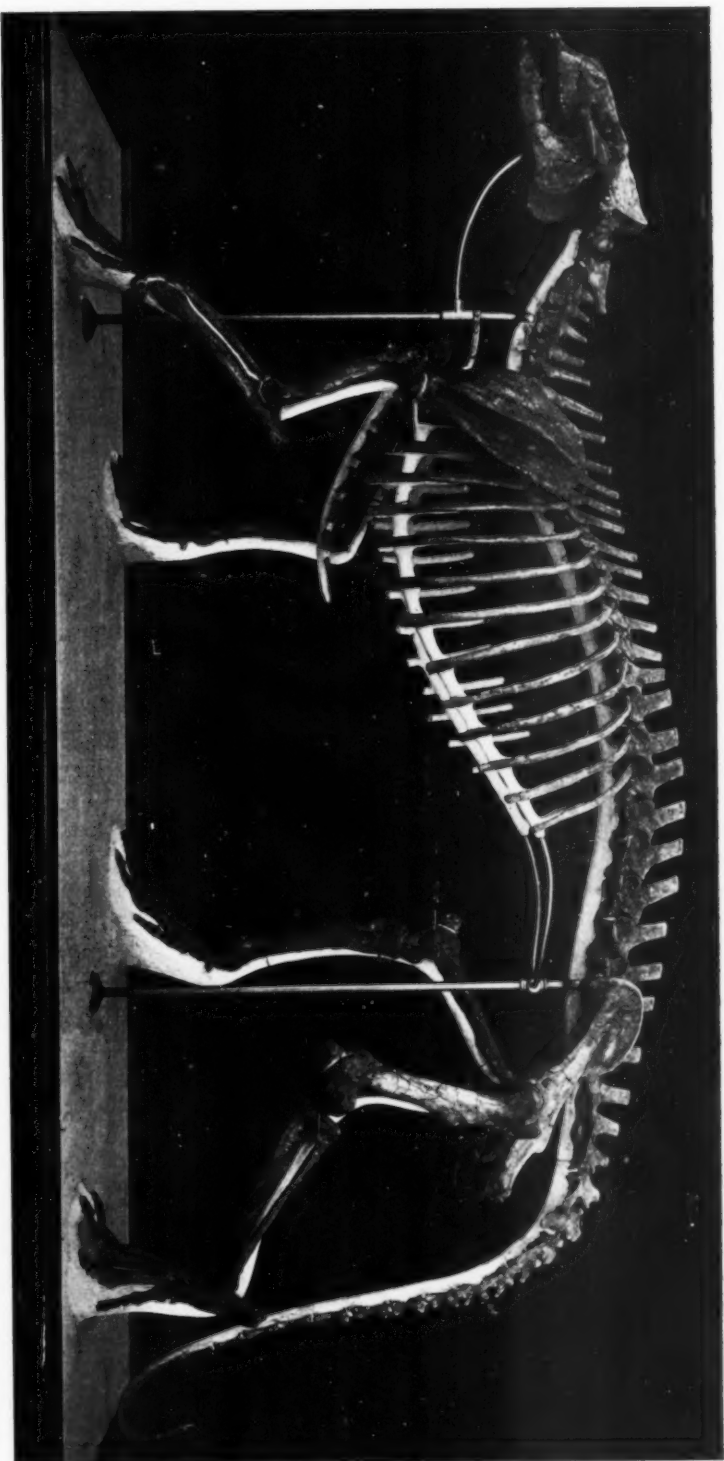
the liberality of Mr. Wm. C. Whitney. The Evolution of the Horse is illustrated by a series of feet and skulls, and of complete skeletons, from the little Four-Toed Horse of the Lower Eocene to the different varieties of the modern animal. The construction of the modern Horse, structure of the bones, the way in which the teeth grow, characters of the different races of domestic Horse and of the different wild species are shown in the end case (Case 15).

NORTH (LEFT) SIDE.

First come the AMBLYPODS and CONDYLRARTHS. These groups of Primitive Hoofed Mammals are first found in the lowest Eocene strata, at the very beginning of the Age of Mammals and they became extinct before the end of the Eocene epoch. Like so many other races the Amblypods begin with small hornless animals (*Pantolambda*) and finally develop into huge elephantine beasts (*Uintatherium*) with six horns on the skull, and great sabre-like tusks. The Condylarths were more slender types, fitted for running. The best known among them is *Phenacodus*, which is considered to represent very nearly the prototype of the hoofed mammals, although it was not the direct ancestor of the later groups.

The second alcove is devoted to Rodents, Insectivores, Bats, Marsupials and other groups of small mammals, among which are the ancestors of the Monkeys and Lemurs and collateral ancestors of Man. Most of these remains are small and incomplete. Here are also some very fragmentary remains of ancient and primitive mammals which represent all that we know of the evolution of the mammalia during the Age of Reptiles, before the Age of Mammals began. These teeth and jaws are of interest because they are the oldest of mammals, from some of which are probably descended all the later mammal groups.

In the third alcove are the Carnivorous Mammals, on one side the CREODONTS or Primitive Carnivora, on the other the True CARNIVORA (Dogs, Cats, Bears, Martens etc.), represented by a number of finely preserved mounted skeletons, and a large series of skulls, together with other specimens.



MOUNTED SKELETON OF PHENACODUS IN NORTH ALCOVE 2
This animal, although not a direct ancestor, represents the prototype of the hoofed mammals

Most remarkable among extinct carnivora are the Sabre Tooth Tigers, in which the upper canine teeth are enlarged into long, curving, flattened, serrate fangs, most terrible weapons, effective no doubt against the thick hides of the primitive pachyderms.

The fourth alcove is very narrow. In it are placed
North
Alcove 4. a few remains of fossil marine mammals: Seals, Ceta-
Marine ceans and Sirenians. These groups are very imper-
Mammals. fectly known as fossils.

The fossil ELEPHANTS and Mastodons are in the next broad alcove, about the middle of the hall. The evolution of these animals is shown by a series of skulls. The Mastodon skeleton and the skull and fore-limb of the Imperial Mammoth from Texas, and tusk of the Siberian (Hairy) Mammoth are noteworthy specimens.

Beyond the Elephants are the ARTIODACTYLS or Cloven-Hoofed Mammals. They divide into two groups, typified by the

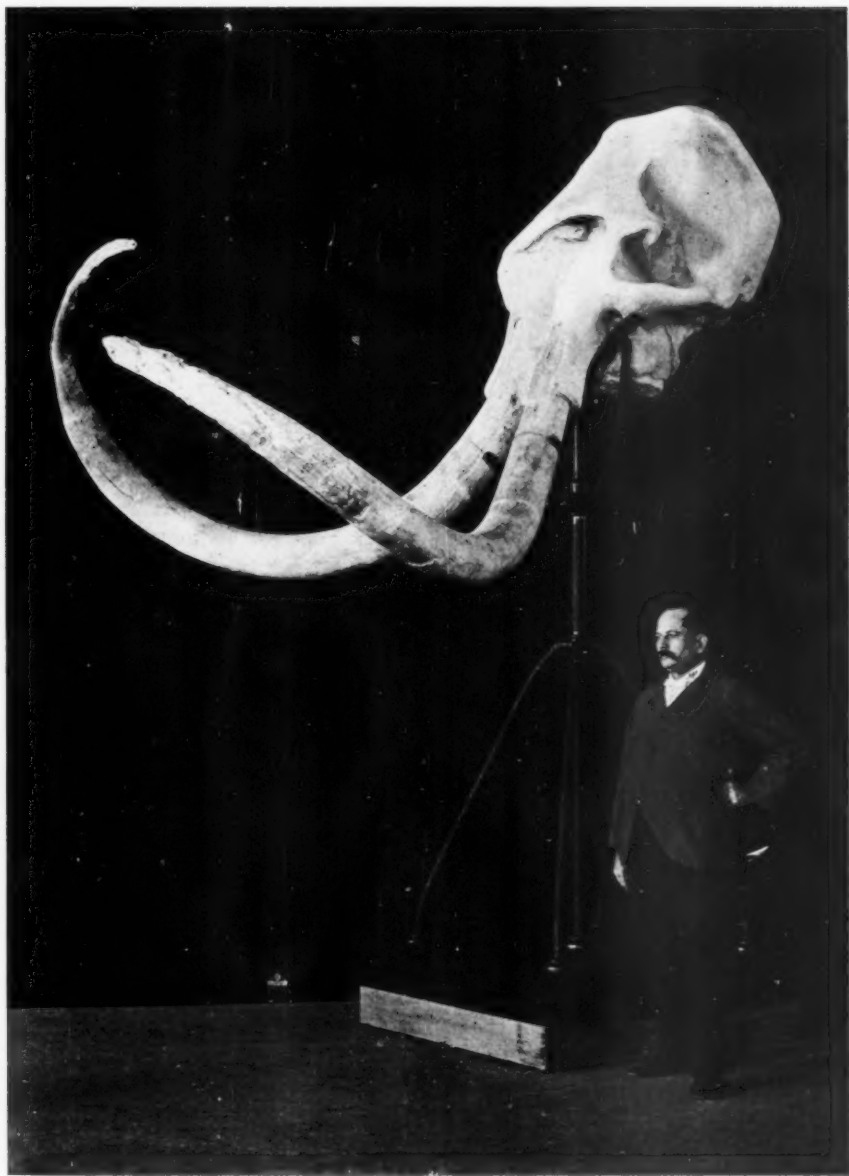
Pigs and the Ruminants, the latter including the greater part of modern hoofed mammals, but by no means proportionally common as fossils. First among the fossil

artiodactyls are the Elotheres, an extinct race of large animals distantly related to Pigs and Hippopotami. Next are the fossil Peccaries; then the Oreodonts, pig-like animals with the teeth

of ruminants, very abundant in America during the middle and later Tertiary, but extinct before the Pliocene epoch. Then come the Camels, which although now found only in Asia and South America, originated in North America, and afterwards migrated to these other continents and became extinct in their native land. The evolution of these animals is shown by a series of stages only less complete than the stages in the evolution of the Horse.

The higher ruminants (Deer, Antelope, Sheep and Cattle) are rather poorly represented in the collections. The Great Irish

Deer is the most striking among the extinct species; attention is also called to the mounted skeletons of *Protoceras*, a deer-like primitive ruminant of the Oligocene epoch, and of *Merycodus*, a graceful little animal of the Miocene epoch intermediate between the Deer and the Prong-horn Antelope.



SKULL AND TUSKS OF THE IMPERIAL MAMMOTH

From a photograph of the specimen on exhibition in the American Museum of Natural History

The northeast corner of the hall is devoted to a number of peculiar groups of SOUTH AMERICAN FOSSIL MAMMALS, almost all extinct. During the Age of Mammals the two great North and South American Fossil Mammals. northern continental areas were joined together from time to time, so that there has been an occasional interchange of animals and plants among them, the races developed in one continent spreading to the other. The animals of North America therefore, although mostly of species distinct from those of Europe and Asia, are more or less nearly related to them. But during most of the Age of Mammals South America was an island continent, as Australia is still; and its extinct animals are as peculiar and as different from those of the rest of the world as are the living animals of Australia different from those of other continents. It is by no means certain where these animals originally came from, but there is much evidence to show that both South America and Australia were peopled from an Antarctic continent, now sunk beneath the ocean or buried in the ice fields of the more frigid climate of modern times.

Of these peculiar South American groups the most extraordinary are the Edentates, including the Sloths, Armadillos and Anteaters which still survive, and the huge MEGATHERIA or Ground-Sloths and GLYPTODONTS or Tortoise-Armadillos which have become extinct. Others were the TOXODONTS, TYPOTHERES, ASTRAPOTHERES and LITOPTERNA, peculiar groups of hoofed animals all now extinct. Some of the Litopterna lost their side toes and evolved into a one-toed race curiously like the horses of the northern hemisphere, although not at all related to them; this is one of the most interesting examples of the parallel adaptation of two different races of animals to similar conditions of life; the horses in the plains and prairies of the north, the litopterna in the pampas of the southern continent.

The best example of the evolution of a race of animals is shown in the southeastern corner of the hall. Here is exhibited **Instances of the Ancestry of the Horse**, the specimens from successive geological strata showing how the modern Horse has descended from diminutive ancestors with four toes on each forefoot and three on each hind foot, and with teeth and other

AGE OF
REPTILES

AGE OF MAMMALS
ESTIMATED 300-500 YEARS

AGE OF MAN.
ESTIMATED AT 50,000 YEARS

PLEISTOCENE

MODERN

PLIOCENE

MIOCENE

OLIGOCENE

Eocene

CRETACIC

Chicago's *Chicago Tribune* in the Fall of 1901 and *The New York Times* in the Fall of 1902.

Only use these tags: `
Oliver's Horrible Hair There's tons in each foot.
 The Sids Toes Touch the Ground.`

Pharmaceuticals: More Than Just an Antibiotic
The Side Effects do not reach the ground.

Some Pterodactyls have Three Toes, others have
One Toe on each Foot.

Pleistocene Morses have One Toe on each Foot

Modern Horses have One Toe each

UNIVERSITY OF MICHIGAN LIBRARY

CONCLUSIONS

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MELISSA

WETSCHNAPP

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1

EVOLUTION OF THE HORSE. FEET

parts of the skeleton different from those of their modern representatives.

Almost equally complete, although less familiar, is the series illustrating the *Ancestry of the Camel*, which may be found on the north side of the hall near the east end. These animals, like the Horses, evolved from small and primitive ancestors to large and highly specialized descendants, and then became extinct in their former home, the broad and arid plains of western America, before the advent of civilized man, but survived to modern times in other parts of the world (Asia, Africa and South America). Less complete series are the skulls and skeletons illustrating the ancestors of Titanotheres and the ancestors of Rhinoceroses. These are ranged along the south side of the hall beginning at the entrance.

All these series have been placed according to geological age. The most ancient specimens, found in the lowest rock-strata, and hence representing the earliest stage of evolution, are placed first in the series. The most recent ones, found in the uppermost rock-strata, and representing the final stage of evolution of the race, are placed last. Arranging the species of a race from each stratum in the order of the age of the strata, we find that they show a regularly progressive change from the most ancient to the most recent. At no point in a given series can we draw a line and say: This is and that is not, a Horse—or a Camel—or a Rhinoceros. The visitor, therefore, can demonstrate for himself the evolution of the race of Horses or Camels or Rhinoceroses, within certain limits. Of the evolution of Man we have no satisfactory illustration from fossils.

It should be observed that the evolution of a race consists mainly in the adaptation of the structure of the animals to particular surroundings and habits of life. There is also a universal progress in intelligence, the more ancient animals having relatively smaller brains than their successors.

The water-color restorations by Charles R. Knight, done under the immediate supervision of Professor Osborn, mainly **Water-color** based on complete skeletons exhibited in this hall, **Restora-** show the *probable appearance* of the different extinct **tions.** animals, according to our best judgment, as indicated by the characters of the skeleton, appearance of their nearest

surviving relatives and the habits of life for which the animals seem to have been fitted. The general proportions of the animal, the outlines and form of head and body, and, to a great extent, the expression of the features are usually accurately known from the fossil skeleton. The nature of the skin is sometimes but not often certainly known, and the coloring is always conjectural,



SCENE IN THE BAD-LANDS OF THE UINTA BASIN—TERTIARY FOSSIL FIELD OF
NORTHEASTERN UTAH

the palæontologist and the artist having been guided by the coloring of living relatives and the supposed habits of the animal.

The window transparencies are enlargements from photographs of the regions where the fossils occur, and generally show the localities where unusually fine specimens in this hall were found. The expeditions sent out yearly to the fossil fields carry with them photographic outfits, and several hundred characteristic views have been taken, from

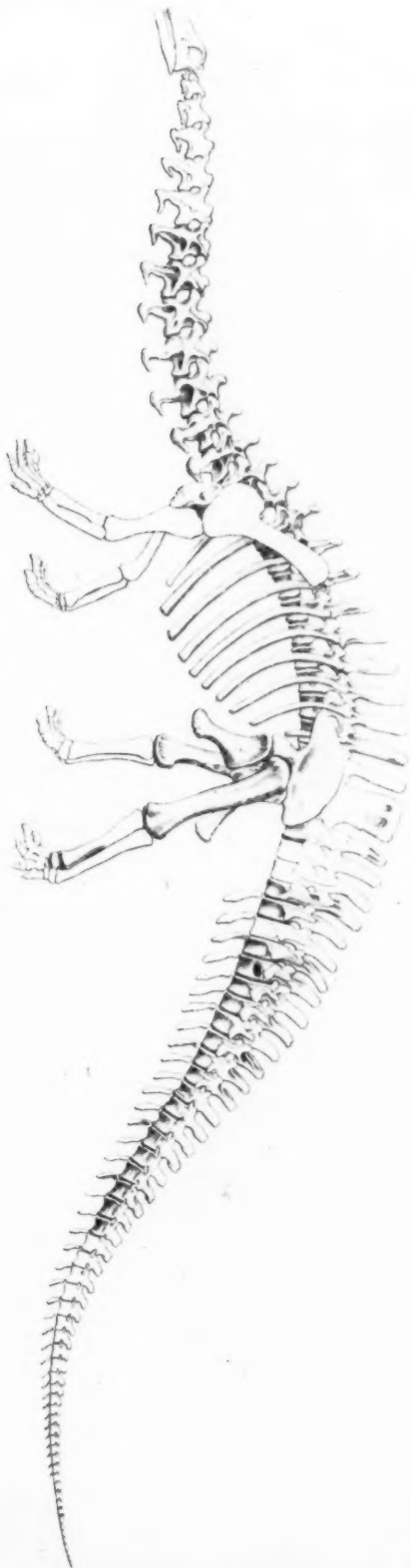
Window
Transparencies.

which these have been selected. The pillar cards and general labels in the cases give detailed information about each group of fossils. One of the cases in the center of the middle aisle illustrates the method by which the fossils are collected and conveyed to the Museum. The charts at each side of the entrance show the order in which the rock-strata lie, one over another, and the kinds of fossils found in each stratum.

EAST WING. HALL NO. 407. FOSSIL REPTILES, ETC.

This hall forms an introduction to an earlier world, the Age of Reptiles. These fossils are of strange and unfamiliar outlines, quite unlike ordinary quadrupeds; they represent an era, long since passed away, when reptiles were the "lords of creation." Chief among them were the Dinosaurs, great land and amphibious reptiles to which the greater part of this hall is devoted. They occupy the north, east and west sides and the center.

The AMPHIBIOUS DINOSAURS, on the west and north sides and in the center of the hall, were the largest of land animals, **Amphibious** some of them sixty to seventy feet in length, and of **Dinosaurs** enormous bulk. They were quadrupedal beasts, with long necks and long tails, and comparatively long and very massive limbs. The head was very small in proportion to the size of the animal, and the brain inferior to that of modern reptiles. They were cold-blooded, slow-moving, unintelligent creatures, vast storehouses of flesh which lived and grew to huge size with but little occasion for very active exertion amidst the rich vegetation of the moist and tropical climate of the reptilian era. Several incomplete skeletons of Amphibious Dinosaurs are exhibited, besides limbs and other separate parts. The Brontosaurus skeletons in Case 1 (on the right-hand or south side of the entrance) and in the center of the hall are among the largest. The thigh bone in this animal was nearly six feet long and weighs in its petrified state 500 to 600 pounds. The *Diplodocus* (Case 2 on the left-hand or north side of the entrance) was less robust but almost as long. This specimen lacks the fore part of the skeleton and most of the limbs, but the tail is very perfectly



SKELETON OF BRONTOSAURUS

RESTORATION OF THE SKELETON OF AN AMPHIBIOUS DINOSAUR OF THE AGE OF REPTILES. THE SKELETON WAS 66 FEET LONG



TAKING UP FOSSIL DINOSAUR BONES AT "BONE CABIN" QUARRY, WYOMING
Parts of several skeletons appear in the photograph

preserved. In Case 4 are limbs and other parts of several species of Amphibious Dinosaurs.

The BEAKED DINOSAURS (Predentata) northeast corner of the hall, had a horny beak or bill at the front of the jaw, and teeth at the back of it. They were most extraordinary and bizarre animals, huge in size, although not so large as the Amphibious Dinosaurs. *Stegosaurus* had a series of great bony plates projecting from the back, and stout bony spines on the tail. *Triceratops* had an enormous skull with three great horns projecting forward, and a strong bony frill projecting backward around the neck. Both these were quadrupedal animals with massive limbs and elephantine feet. *Hadrosaurus* was a bipedal dinosaur with long hind limbs and three-toed bird-like feet, but with hoofs instead of claws. Its beak was broad and flattened, as in the spoon-bill duck or *Ornithorhynchus* of Australia.

The CARNIVOROUS DINOSAURS are exhibited on the east side of the hall (opposite the entrance). They were bipeds with bird-like feet, sharp claws and large heads with sharp-pointed teeth. Some of these, the Megalosaurus, were of gigantic size, much larger than any modern carnivore. *Allosaurus* was as large as an elephant, while other Megalosaurus were even larger. Other Carnivorous Dinosaurs, such as *Ornitholestes*, were small and of slender proportions; these probably lived on the small animals of that period—toothed birds, pterodactyls, small reptiles of various kinds—while the large herbivorous dinosaurians were more probably the chief prey of the Megalosaur.

All the Dinosaurs had become extinct by the end of the Age of Reptiles. Their place was taken by the more intelligent and adaptable mammals, the evolution of which into the different kinds of modern quadrupeds has been seen in the Hall of Fossil Mammals.

On the south side of the Fossil Reptile Hall are fossil remains of four other groups of reptiles, the CROCODILES, TURTLES, LIZARDS and SNAKES, which, more fortunate than the dinosaurs, have survived to the present day, though in much diminished numbers and importance.

Beaked
Dinosaurs,
Stegosaurus,
Triceratops
and *Had-*
rosaurus.

Carnivor-
ous
Dinosaurs.

Other Rep-
tiles—
Crocodiles,
Turtles,
Pterodac-
tyls etc.

THE AGE OF REPTILES

(MESOZOIC)

GEOLOGICAL FORMATIONS and CHARACTERISTIC ANIMALS.

THE AGE OF REPTILES PRECEDED THE AGE OF MAMMALS, AND IS REPRESENTED IN VARIOUS PARTS OF THE WORLD BY MARINE, ESTUARINE AND FRESH-WATER DEPOSITS DIVIDED INTO THREE GREAT PERIODS, TRIASSIC, JURASSIC AND CRETACEOUS.

DURING THIS AGE THE REPTILES APPEARED, FLOURISHED GREATLY, AND DECLINED AT ITS CLOSE TO THEIR PRESENT IMPORTANCE. THE MAMMALS APPEARED WELL DOWN IN THIS AGE BUT REMAINED SMALL AND SCARCE UNTIL ITS END.

AGE OF REPTILES	PERIODS	FORMATIONS	THICKNESS	CHARACTERISTIC ANIMALS
AGE OF MAMMALS	EOCENE	TORREJON		MAMMALS IN LARGE NUMBERS
		PUERCO	800	TRUE LIZARDS and SPHENODONS ALLIGATORS and CROCODILES TURTLES NUMEROUS BONY FISHES (TELEOSTS)
	CRETACEOUS	LARAMIE	1000 5000	CARNIVOROUS DINOSAURS HERBIVOROUS DINOSAURS HORNED HERBIVOROUS DINOSAURS NUMEROUS SMALL MAMMALS LAST PLESIOSAURS FIRST SOFT-SHELLED TURTLES MODERN TAILED AMPHIBIANS (CAECILIANS)
		MONTANA	1200 8700	BIRDS, PROBABLY TOOTHED PTERODACTYLS, TURTLES MOSASAURS and PLESIOSAURS GIGANTIC MARINE TURTLES DOLICHOSAURIAN LIZARDS SHARKS, CAT-FISH, STURGEONS and SQUIDS
		COLORADO	1000 3000	TOOTHED BIRDS, TOOTHED PTERODACTYLS DINOSAURS MOSASAURS and PLESIOSAURS LARGE MARINE TURTLES BONY FISHES (TELEOSTS), SHARKS GARPID FISHES.
		DAKOTA	400 5000	FIRST SNAKES TURTLES
		COMANCHE	300 2600	TRUE LIZARDS and DOLICHOSAURS HERBIVOROUS DINOSAURS (MAMMALS) CARNIVOROUS DINOSAURS (MAMMALS) PTERODACTYLS, TOOTHED and TOOTHLESS MOSASAURS ICHTHYOSAURS and PLESIOSAURS CROCODILES, TURTLES, SHARKS and GARPID FISHES CHONDRIO FISHES
		WALDEN POTOMAC		
	JURASSIC	UNION		PRIMITIVE MAMMALS (MAMMALS) HERBIVOROUS DINOSAURS (MAMMALS) CARNIVOROUS DINOSAURS (MAMMALS) HERBIVOROUS DINOSAURS (MAMMALS) TURTLES, PTERODACTYLS
		WINDOMER	1500 4000	FIRST BIRDS WITH TEETH (SAURIA) ICHTHYOSAURS (TOOTHED and TOOTHLESS) PLESIOSAURS, PTERODACTYLS (TOOTHED) SMALL PRIMITIVE MAMMALS LONG NOSED CROCODILES (TELEOSTS) ICHTHYOSAURS and PLESIOSAURS FIRST HERBIVOROUS DINOSAURS TURTLES, PTERODACTYLS SHARKS and CHONDRIO FISHES
	TRIASSIC	WHAFFIC		REPTILE MAMMALS (CHONDRIO FISHES) TRITOLONG, M-COLLATED
		RICHMOND COAL BEDS and CONN and NEW JERSEY	3000 6000	FIRST CARNIVOROUS DINOSAURS LAST LABYRINTHODONTS PRIMITIVE CROCODILES (MAMMALS) FIRST TURTLES and PTERODACTYLS FIRST TELEOST and BONY FISHES SHARKS, CHONDRIO FISHES and LUNG FISHES PLESIOSAURS (NOTHOSAURS) FIRST ICHTHYOSAURS (MIXOSAURS) PLACODONTS LARGE AMPHIBIANS (LABY- RINTHODONTS) FIRST PLESIOSAURS (NOTHOSAURS)
AGE OF AMPHIBIANS AND COAL PLANTS	PERMIAN		600 1800	FIRST REPTILES (NOTHOSAURS) PROGONOSAURS and PELYSOSAURS PRIMITIVE AMPHIBIANS (STENOCEPHALA) SHARKS, LUNG FISHES, CHONDRIO FISHES and CHONDRIO FISHES
	CARBONIFEROUS			PRIMITIVE AMPHIBIANS (STENO- CEPHALA, MOUTH SMALL SPECIES) PRIMITIVE SNAKES and LUNG FISHES CHONDRIO FISHES and CHONDRIO FISHES

DIVISIONS OF THE AGE OF REPTILES

Characteristic fossil reptiles, amphibians and fishes, and the formations in which they are found.

Crocodiles in their palmier days were of world-wide distribution and comprised marine as well as fresh-water types. Turtles are among the commonest of fossils in the Bad-lands and some of them of very large size. Lizards and snakes, the only common reptiles of modern times, are very rare and fragmentary as fossils, and little is known about them.

Besides these surviving groups, several extinct groups of reptiles are shown on the south side of the hall. The BELODONTs, of the dawn of the Reptilian Era, were partly intermediate between Dinosaurs and Crocodiles. The still older PELYCOSAURS were remarkable for an enormous rigid bony fin on the back; among the contemporary THERIODONTs there existed perhaps the remote ancestors of the Mammals. The PTERODACTYLS or Flying Reptiles were the most extraordinary of reptiles, tailless, with batlike wings, supported on the enormously lengthened little finger, and with a spread in the largest species of twenty feet from tip to tip. The RHYNCHOCEPHALIANS are an interesting group of very primitive reptiles, of which a single species, the Tuatara, still survives in New Zealand.

FOSSIL AMPHIBIANS.

The Age of Reptiles was preceded by an Age of Amphibians, when the dominant animals were allied to modern Frogs, Toads and Salamanders, but had the skulls covered by a solid bony roof and the bodies by more or less scaly armor. These Armored Amphibians have been called **Armored Amphibians (Stegocephalia)**. Stegocephalia (στέγη, κεφαλή = deck-head) or Labyrinthodonts (λαβύρινθος, ὀδούς = labyrinth-tooth, from the complicated fluting or infolding of the enamel on the teeth). Some of them, like *Eryops*, were large animals with heads eighteen inches long and a foot wide; others resembled colossal tadpoles; but the majority of them were quite small animals, either proportioned like salamanders or else long and eel-like with minute limbs or none at all.

These fossil Amphibians are the most ancient of fourfooted animals, and are not far removed from the central type from which all the higher vertebrates are believed to be descended. They are exhibited near the middle of the south side of the Hall of Fossil Reptiles.

FOSSIL FISHES.

Some of the finest specimens of fossil fishes in the collection are exhibited in the corridor hall. Others are placed in the southwest corner of the Fossil Reptile Hall. These range from the exceedingly ancient and archaic types, such as the huge *Dinichthys* of the Age of Fishes, older even than the fossil Amphibians, to more modern and familiar types such as the fossil Perch and Herring of the Green River Tertiary formation.

THE AMERICAN MUSEUM JOURNAL

EDMUND OTIS HOVEY, *Editor*

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LOUIS P. GRATACAP, } *Advisory Board*
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Issued quarterly

Subscription, One Dollar per year

For sale at the Museum at twenty-five cents per copy

Subscriptions should be addressed to The Editor, American Museum Journal,
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Guide Leaflets.

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- No. 1. **THE BIRD ROCK GROUP.** By FRANK M. CHAPMAN, Associate Curator of Mammalogy and Ornithology. October, 1901.
- No. 2. **THE SAGINAW VALLEY COLLECTION.** By HARLAN I. SMITH, Assistant Curator of Archæology. December, 1901.
- No. 3. **THE HALL OF FOSSIL VERTEBRATES.** By W. D. MATTHEW, Ph.D., Assistant Curator of Vertebrate Palæontology. January, 1902.
- No. 4. **THE COLLECTION OF MINERALS.** By LOUIS P. GRATACAP, A.M., Curator of Mineralogy. February, 1902.
- No. 5. **NORTH AMERICAN RUMINANTS.** By J. A. ALLEN, Ph.D., Curator of Mammalogy and Ornithology. March, 1902.
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American Museum of Natural History.

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WHAT IT IS DOING FOR ITS MEMBERS :

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During the year 1902 it maintained exploring parties in various parts of the United States and in :

Siberia,	Alaska,	Central America,	Greenland,
China,	British Columbia,	Venezuela,	Baffin's Bay,
Japan,	Mexico,	Martinique,	Hudson Bay,
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Memoirs—twenty-two have been issued.

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What the Museum Needs.

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Funds to make additional groups similar to those in the Bird, Mammal and Ethnology Halls.

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Means for collecting fossils and geological specimens.

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All money received from membership fees is used for increasing the collections.

Publications.

The publications of the Museum consist of an Annual Report, in octavo, about 80 pages; the Bulletin, in octavo, of which one volume, consisting of about 400 pages, and about 25 plates, with numerous text figures, is published annually; the Memoirs, in quarto, published in parts at irregular intervals; an Ethnographical Album, issued in parts, and the American Museum Journal.

The Knickerbocker Press, New York

